

Maintenance Manual MM-0951

OnGuard™ Collision Safety System

Revised 04-11



Service Notes

About This Manual

This service manual applies to all vehicles equipped with the OnGuard™ Collision Safety System.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company's maintenance and service, installation and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.


Hazard Alert Messages and Torque Symbols

WARNING

A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

CAUTION

A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

 This symbol alerts you to tighten fasteners to a specified torque value.

How to Obtain Additional Maintenance and Service Information

On the Web

Visit Literature on Demand at meritor.com to access and order product, service, aftermarket, and warranty literature for Meritor's truck, trailer and specialty vehicle components.

Literature on Demand DVD (LODonDVD)

The LODOndVD contains product, service and warranty information for Meritor components. To order the DVD, visit Literature on Demand at meritor.com and specify TP-0742.

How to Obtain Tools and Supplies Specified in This Manual

Call Meritor's Commercial Vehicle Aftermarket at 888-725-9355 to obtain Meritor tools and supplies.

TOOLBOX™ Software (10.0 or higher) is available from SPX Service Solutions at 1-800-328-6657.

Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. Meritor WABCO reserves the right to revise the information presented or to discontinue the production of parts described at any time.

pg. i	Asbestos and Non-Asbestos Fibers
1	Section 1: Introduction
	Overview
	How OnGuard Works
2	System Components
4	Section 2: Diagnostics, Troubleshooting and Testing
	General Information
	Radar Sensor and Display Software Levels
	Fault Codes
5	Troubleshooting Guide
6	TOOLBOX Software Diagnostics
12	Radar Software Version USO 1.XXXX Fault Code Table
21	Radar Software Version USO 2.XXXX Fault Code Table
45	Hazard Alert Messages
	Radar Inspection and Preventive Maintenance
	Radar System Troubleshooting
49	Electrical System and Harnesses Troubleshooting
51	Component Message Fault Troubleshooting
52	Cruise Control System Troubleshooting
53	Anti-lock Braking System (ABS) Troubleshooting
55	Section 3: Component Replacement
	Hazard Alert Messages
	Radar Sensor
57	Display Replacement
58	Section 4: Appendix
	Product Information Letter #504



ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA.

2. Respiratory Protection. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.

3. Procedures for Servicing Brakes.

- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
- b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
- d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
- e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.

5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

6. Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.



NON-ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.

2. Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

3. Procedures for Servicing Brakes.

- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
- b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
- e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.

5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

6. Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Overview

Adaptive Cruise Control

Adaptive Cruise Control (ACC) is an in-vehicle electronic system that automatically maintains a minimum following interval to a lead vehicle in the same lane, by controlling engine throttle, engine retarder or foundation brakes without driver intervention.

Collision Mitigation System

Collision Mitigation System (CMS), if equipped, is integral to the OnGuard™ Collision Safety System. The system will provide driver alerts with both a visual and audible alarm through an in-cab dash display when the vehicles following distance could result in a rear-end collision. The OnGuard™ Collision Mitigation System will not become active below 15 mph.

Collision Warning System

The Collision Warning System (CWS) is an in-vehicle electronic system that monitors the roadway in front of the host vehicle and warns the driver when a potential collision risk exists at vehicle speed above 15 mph.

Cruise Control

Cruise Control is the standard system that maintains a vehicle speed set by the driver.

OnGuard

OnGuard is a collision safety system that incorporates adaptive cruise control with active braking, CMS, if equipped, and a collision warning system.

Radar Sensor

The radar sensor is mounted in the front of the vehicle and is used to detect target vehicles for the OnGuard Collision Safety System.

SAE J1939 Network

The SAE J1939 Serial Control and Communications Vehicle Network allows various electronic controllers on the vehicle to interact efficiently and in coordination with each other. The interactions between controllers include sharing sensor data and calculated information, allowing subsystems to influence each other's operation and communicating subsystem operating state and configuration.

How OnGuard Works

OnGuard is an Adaptive Cruise Control (ACC) and Collision Warning System (CWS) and if equipped, a Collision Mitigation System (CMS). ACC is a radar based tracking system that works in conjunction with standard Cruise Control to maintain the set cruise speed when no vehicle is being tracked and maintains a safe following distance when a target vehicle is being tracked. The safe following distance is maintained by controlling engine throttle, engine retarder and the foundation brakes without driver intervention. When the target vehicle is no longer being tracked, the set cruise speed resumes automatically.

The CWS provides the driver with an audible and visual alert to a potentially dangerous driving situation. It is integral with the ACC, but also functions when the cruise control is not being used. If the driver is following too close behind another vehicle at a steady driving speed, the following distance alert emits an audible tone and the in-cab dash display screen turns yellow. This alert ends when the driver's vehicle speed drops below the lead vehicle speed and the following distance is increased. The alert also activates if the driver is using the accelerator pedal to override the cruise control and approaches too close to a vehicle. The CWS and following distance alert is disabled (will NOT alert) when the driver's vehicle speed is below 15 mph.

With the cruise control set, the ACC system provides engine throttle and retarder control as well as foundation brake activation if necessary. This automatic brake application is intended only to provide early braking as the driver is recognizing and reacting to the situation (the driver must also apply the brakes in response to the Collision Warning). If the cruise control is not set, the system provides driver alerts with both visual and audible alarms, but does not apply braking, engine throttle or retarder control.

The CWS is always active when at a road speed of approximately 15 mph or faster. No action is needed to turn CWS on and it cannot be arbitrarily turned off. Note, however, that the ACC is only activated when the cruise control is engaged and functions only down to the engine manufacturer's minimum cruise speed.

Collision Mitigation System (CMS) is integral to the OnGuard™ Collision Safety System. The system will provide driver alerts with both a visual and audible alarm through an in-cab dash display when the vehicles following distance could result in a rear-end collision. If a potential rear-end collision is developing and the driver does not take action to decelerate the vehicle, OnGuard™'s Active Braking automatically de-throttles the engine, applies the engine and foundation brakes to provide up to 0.35Gs of braking power.

1 Introduction

This Active Braking application is intended only to provide early braking as the driver is recognizing and reacting to the situation — the driver must take the appropriate corrective action in response to the collision warning. The OnGuard™ Collision Mitigation System will not become active below 15 mph.

⚠ WARNING

The OnGuard Collision Safety System should only be considered an aid to drivers in maintaining a safe following distance and is not intended to replace driver control over the vehicle at any time. OnGuard is only intended to initiate braking of the vehicle in an effort to avoid an incident. It is not to be relied on to always function and is merely a backup safety system. In the event the OnGuard Safety System requires activation of the foundation brakes, there is a limit to its maximum braking ability (by design). The driver is expected to intervene and assume control of the braking of the vehicle.

OnGuard should not be relied on to track target vehicles when either or both vehicles (base and target) have entered and are traveling through a curve in the road. ACC is not recommended for use in winding (curving) roads. OnGuard should not be expected to track smaller objects such as motorcycles, mopeds, bicycles, etc. OnGuard will not track fixed or stationary objects.

When operating a vehicle, always use safe driving techniques. The driver is ALWAYS the most important factor in safe vehicle operation.

System Components

Radar Sensor

The radar sensor is mounted in the front of the vehicle and centered in the bumper in most applications. Figure 1.1. The sensor has an electrical connector that provides power, ground and communication to the SAE J1939 network which is required for correct operation.

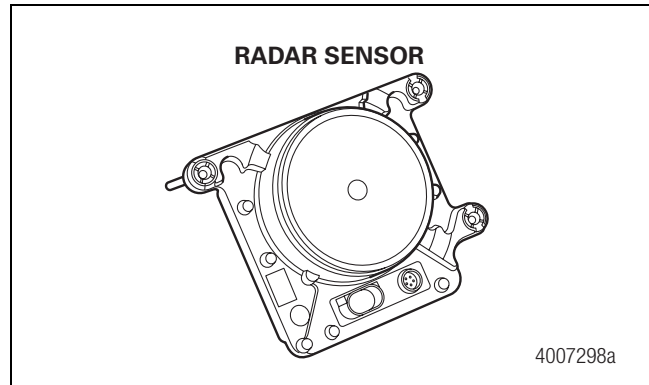


Figure 1.1

Fascia

The fascia is a protective cover for the radar sensor and is assembled to the same bracket on which the radar sensor is mounted. Figure 1.2 and Figure 1.3. The fascia should not be blocked by any foreign matter (dirt, snow, ice, stickers, etc.), otherwise a system fault will occur and the OnGuard system will not operate. There are four styles of fascia to accommodate different applications. Figure 1.2 and Figure 1.3.

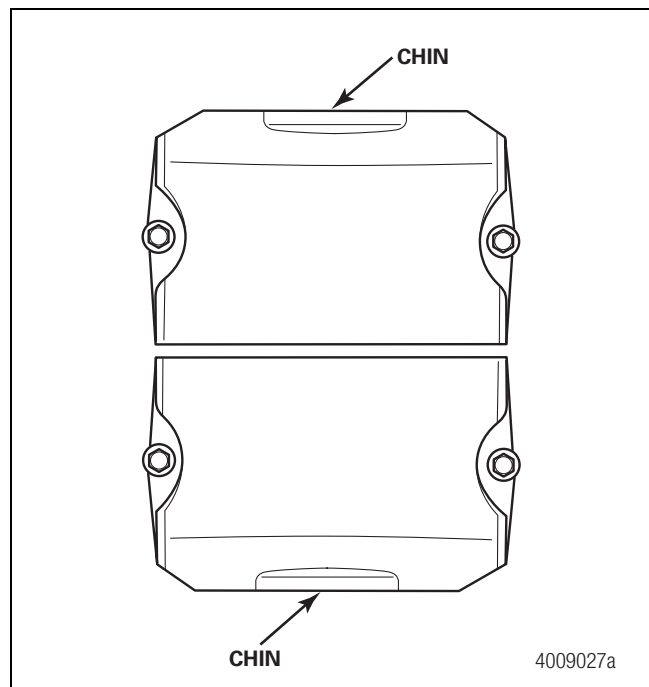


Figure 1.2

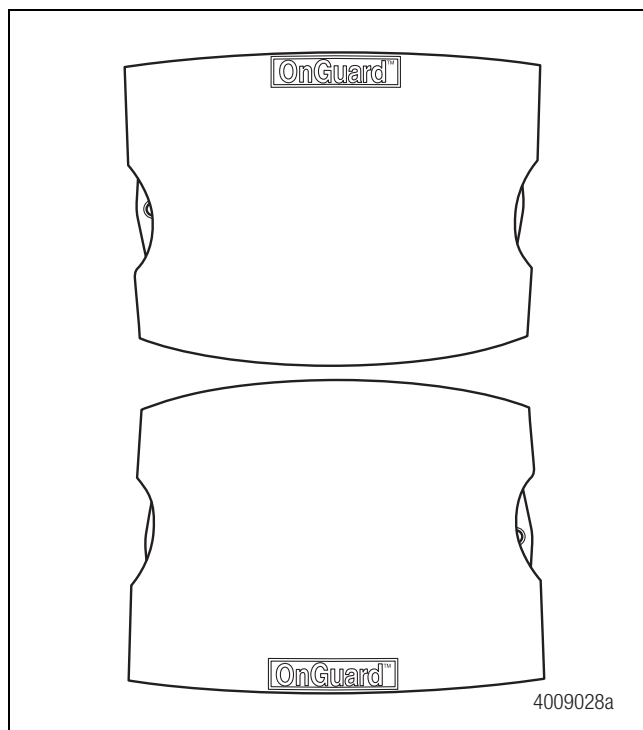


Figure 1.3

Display

The OnGuard Display provides the interface for the driver. Figure 1.4. Audible and visual warnings, as well as verification of correct system operation and faults, are communicated to the driver. The driver is able to monitor the status of target vehicles that the OnGuard system is tracking. The functions of the OnGuard display may be integrated into a vehicle's architecture/dash display. If the vehicle has an integrated display, please refer to your owner's manual for correct operation.

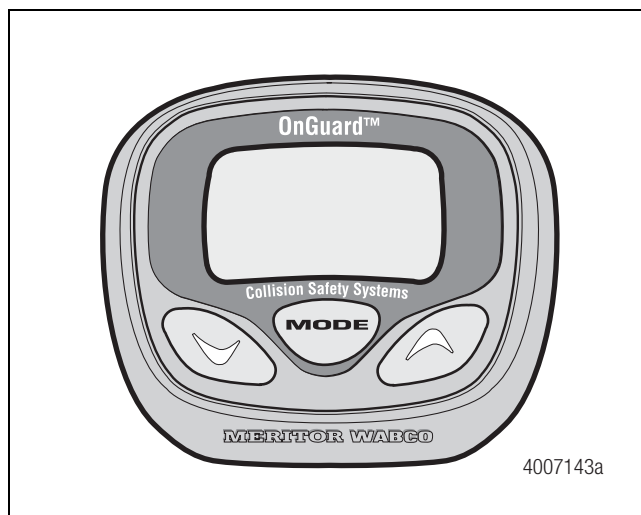


Figure 1.4

Electrical Harnesses

Several electrical harnesses are required for the OnGuard system. These include harnesses to connect the radar sensor to power and ground, as well as the SAE J1939 systems and the OnGuard Display. The individual harnesses will be detailed throughout this maintenance manual. Reference to the vehicle manufacturer's service manual may also be required to service some of the electrical harnesses.

2 Diagnostics, Troubleshooting and Testing

General Information

Radar Sensor and Display Software Levels

Many diagnostic and troubleshooting procedures will require knowledge of the software level of the OnGuard radar sensor and display. The software level of these two components can be determined through the display itself. Figure 2.1. To determine the software level:

1. Turn the ignition key on and wait for the display to power up.
2. Press the "MODE" button on the display until the screen labeled "Software Rev" is shown.

Take note of the software version of each component for reference during the procedures required in this manual and for component replacement.

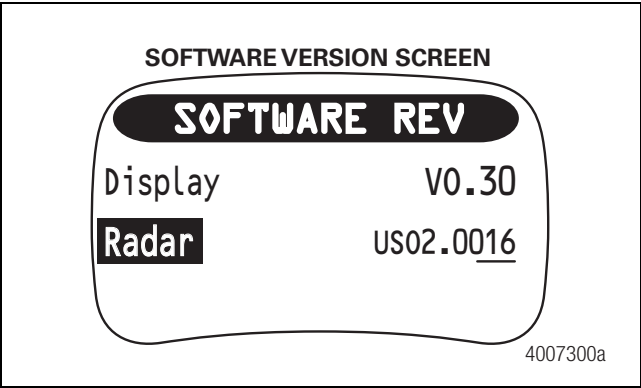


Figure 2.1

Fault Codes

If the system is not operating correctly, a fault code may be shown on the display. Only currently **active fault codes** are displayed. Figure 2.2.

NOTE: It is important to document any fault code that is displayed because stored fault codes are not displayed and are only retrievable with TOOLBOX™ Software.

NOTE: When active codes are present, the OnGuard system is disabled. This includes ACC, CWS, CMS and the vehicle cruise function.

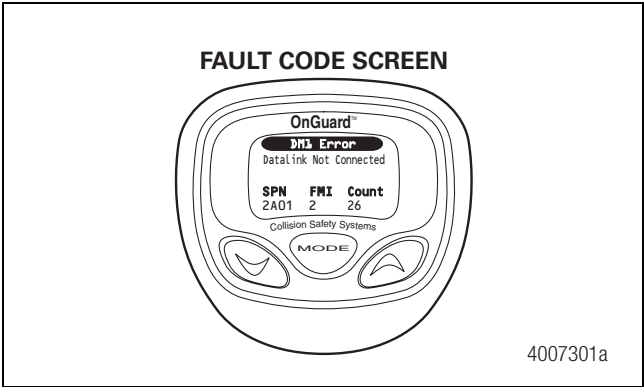


Figure 2.2

Multiple fault codes may be present. If a fault code is shown on the display, use the UP and DOWN keys on the OnGuard display to scroll through each fault code. Figure 2.3. Record each code for future reference.

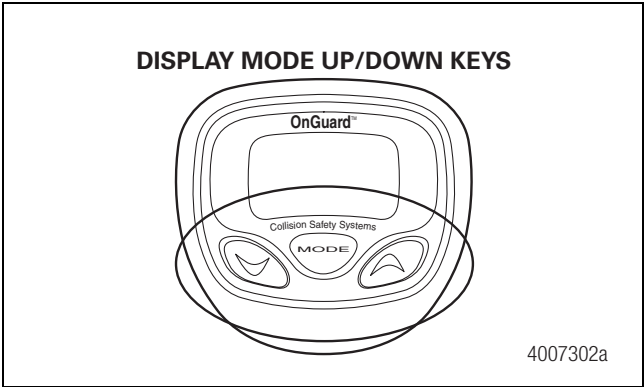


Figure 2.3

There are two fault code tables in this section. The radar software version is required to determine which fault code table to use. The radar software version will be either USO 1.XXXX or USO 2.XXXX. Figure 2.1. Fault Code Table A is for radar software 1.XXXX. Fault Code Table B is for radar software USO 2.XXXX.

The Troubleshooting Section and Subsection entries in the far right column of the Fault Code Tables refer to the more detailed information provided later on in this manual.

If the display shows a fault code not listed in the Fault Code Tables, contact OnTrac Customer Service Center at 866-OnTrac1 (668-7221) for assistance.

2 Diagnostics, Troubleshooting and Testing

OnGuard fault codes may be generated and displayed during service procedures on other electrical system components (i.e., engine, transmission, ABS, etc.). After completion of service on the other vehicle system components, cycle the ignition OFF for one minute and then turn the ignition back ON. Start the engine and run it at idle speed for one minute. This frequently clears the OnGuard fault code(s).

Troubleshooting Guide

If the OnGuard display does not light up when the engine is on, make sure that the display brightness is turned up sufficiently to make the screen visible. If the display brightness adjustment is correct or the adjustment screen cannot be seen, the display is not receiving any power or input signals. This can be caused by problems in the electrical harness. Refer to Display Harness Electrical Checks in the Electrical System and Harness Troubleshooting Section.

OnGuard fault codes may be generated and displayed during service procedures on other electrical system components (i.e., engine, transmission, ABS, etc.). If the OnGuard display screen turns red with fault codes visible after the vehicle has been serviced for other vehicle system issues, cycle the ignition OFF for one minute, turn the ignition back ON, start the engine and run at idle speed for one minute. This frequently clears the OnGuard fault code(s).

If the OnGuard Collision Safety System is not correctly tracking vehicles that are in your lane or is tracking vehicles that are not in your lane, this may be due to radar operational issues.

Typically these are radar operational issues that can result from the following problems:

- Debris (dirt, snow, ice) on the radar fascia or between the fascia and the radar sensor. This must be cleaned off.
- The radar fascia may be mounted upside down. The radar fascia should be mounted with the indented “chin” positioned facing the radar electrical connector location.
- The radar sensor may be loose or not tightly secured on the alignment screws. Check that the alignment screws are turned in so that the gap between the radar sensor and the mounting bracket is 1/4 to 3/8 inch. Also check that the radar sensor alignment screws are seated in the ball socket clips and the ball socket clips are fully seated in the radar sensor. Verify that the ball socket clips and through-hole adjusters are not broken. Adjust, repair and replace the alignment screws, ball socket clips and through-hole adjusters as necessary.

- The radar sensor may be too close to or actually contacting the bumper as mounted, which will affect the radar signal. There should be at least 1/4 inch of clearance between the fascia, radar sensor or bracket and the bumper. Check that the adjustment screws are turned in so that the gap between the radar sensor and the mounting bracket is 1/4 to 3/8 inch. If this does not resolve the problem of the fascia or radar sensor touching the bumper, contact your vehicle manufacturer representative on adjustments to the bumper for radar sensor clearance.
- The radar may not be aligned correctly. Refer to the Radar Sensor Alignment procedure.

If the OnGuard display is showing a red screen with the message “ACC1 Link Error”, Figure 2.4, this screen means that the display isn’t receiving SAE J1939 network messages from the radar sensor. This can be caused by problems in the electrical harness. Refer to Radar Harness Electrical Checks in the Electrical System and Harness Troubleshooting Section.

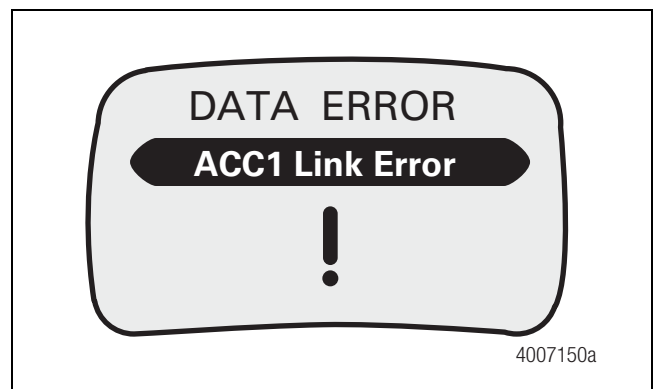


Figure 2.4

If the OnGuard display shows a red screen with the message “Mode 6 Error”, Figure 2.5, this screen means that the display cannot process error messages that it is receiving from the radar. Replace the display per the Display Replacement procedure in Section 3.

2 Diagnostics, Troubleshooting and Testing

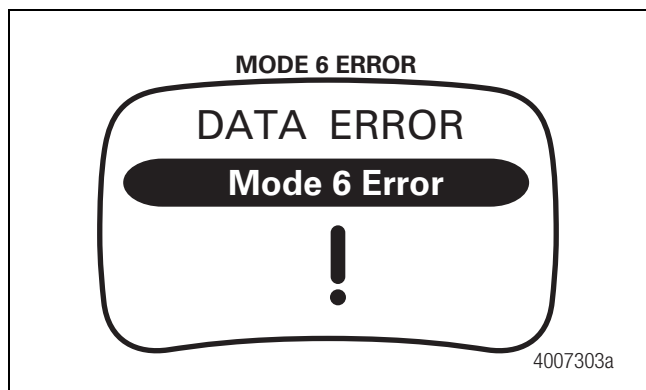


Figure 2.5

If the vehicle's standard cruise control is working and OnGuard Adaptive Cruise Control (ACC) is not working, consult your dealer or engine supplier. This can occur if the engine controller has been re-programmed or the engine parameter that activates OnGuard has been turned off. Consult with your dealer or engine supplier for engine software and parameter adjustments.

If the OnGuard display shows a red screen with a fault code, refer to Table A for Software Version USO 1.XXXX or Table B for Software Version USO 2.XXXX for a description. Also refer to the Troubleshooting Section and Sub-Section of this manual, listed in the last column of Table A or Table B.

NOTE: Be sure to scroll through all active faults using the display UP and DOWN arrow keys.

The Fault Code Screen shown in Figure 2.2 will typically be a one or two line fault description, an SPN error code, an FMI and a count. Look up the error code number in column one of the Fault Code Tables and find the repair instructions. Refer to Table A for Software Version USO 1.XXXX or Table B for Software Version USO 2.XXXX.

TOOLBOX Software Diagnostics

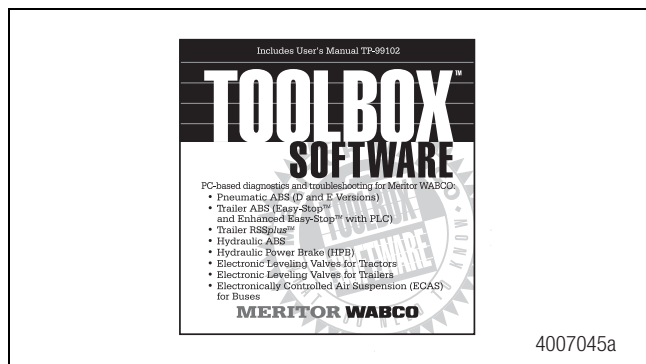


Figure 2.6

NOTE: TOOLBOX™ Software version 10.0 or higher.

NOTE: For installation and setup instructions for using TOOLBOX™ Software, refer to the TOOLBOX™ Software User's Manual, TP-99102. The manual is posted on meritorwabco.com/TOOLBOX.

To access the Meritor WABCO TOOLBOX™ Software from the desktop screen, double-click on the Meritor WABCO PC Diagnostics (TOOLBOX™) icon. Figure 2.7.

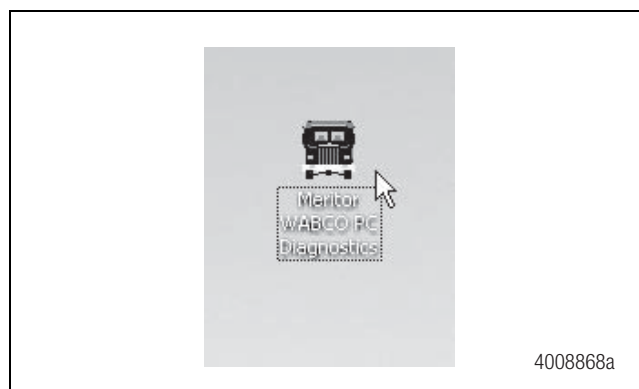


Figure 2.7

From the message box that appears, click on the OnGuard Radar Diagnostics button. Figure 2.8.

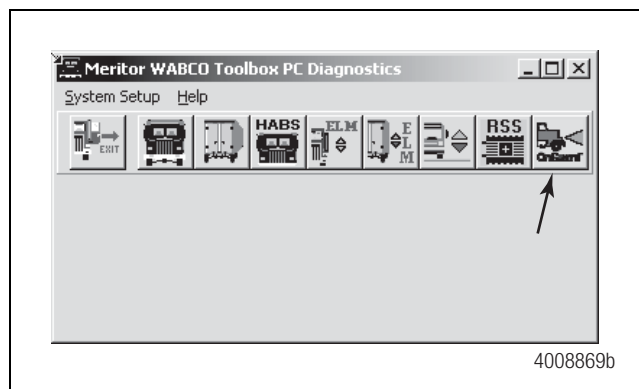


Figure 2.8

2 Diagnostics, Troubleshooting and Testing

Displaying Radar Information:

To retrieve radar sensor information, select “Diagnostic Information” from the OnGuard Radar Diagnostics home screen. Figure 2.9.

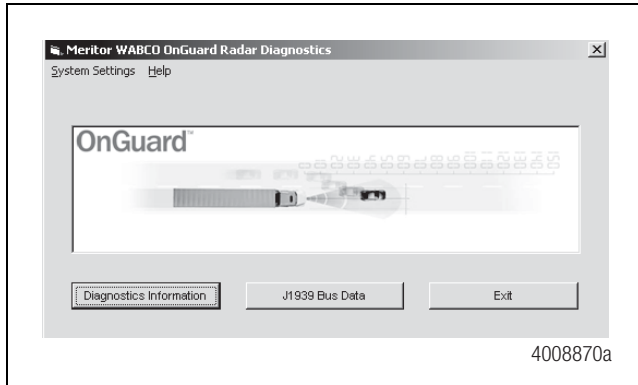


Figure 2.9

This will then display the radar sensor part number and software levels, as well as other important information. Figure 2.10.

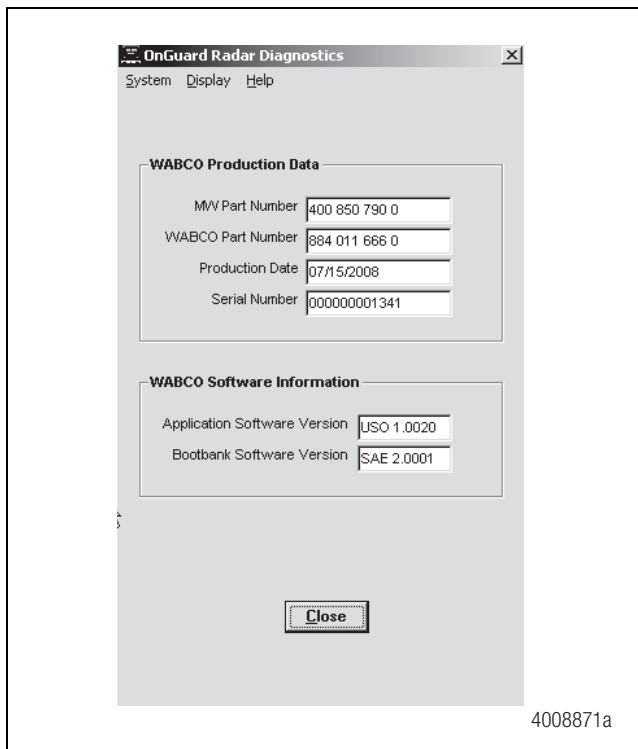


Figure 2.10

Retrieving Faults:

1. To display OnGuard radar sensor faults, select the “Display” option from the menu.
2. From the pull-down menu, select “Diagnostic Trouble Codes” to bring up the fault information screen. Figure 2.11.

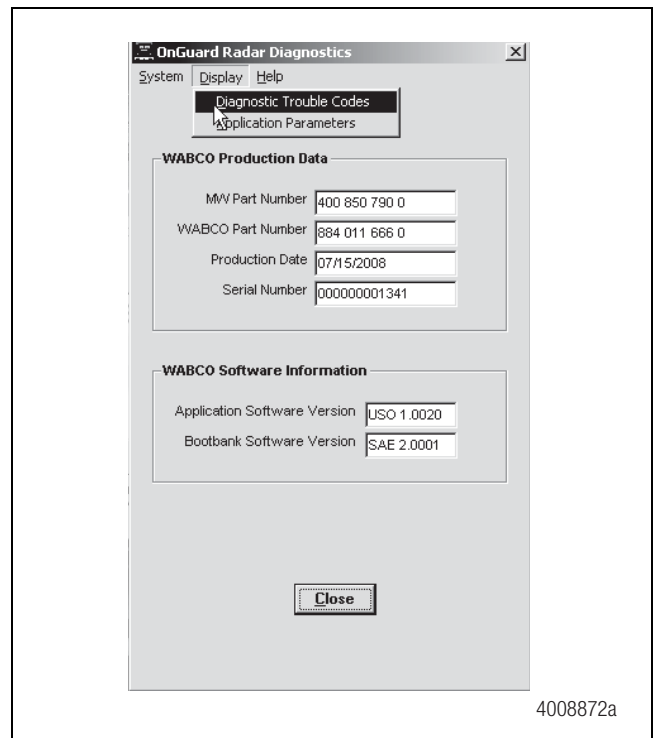


Figure 2.11

2 Diagnostics, Troubleshooting and Testing

3. A description of the fault, the number of times the fault occurred, the suspect parameter number (SPN) and the failure mode identifier (FMI) are all displayed in the Diagnostic Trouble Codes window. Basic repair instructions for each fault are also provided. Figure 2.12. After making the necessary repairs, use the “Clear Faults” button to clear the faults.

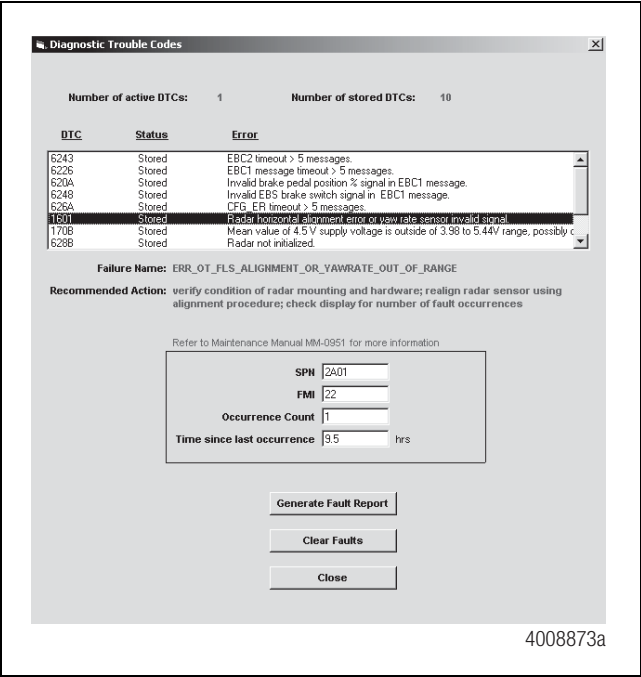


Figure 2.12

4. A fault report can also be generated by selecting the “Generate Fault Report” button, while in the “Diagnostic Trouble Codes” screen. A “Save As” screen will then come up asking you to name the file and select where it will be saved. Figure 2.13. The “Fault Report” screen provides additional information that is not included in the “Diagnostic Trouble Codes” screen. Figure 2.14.

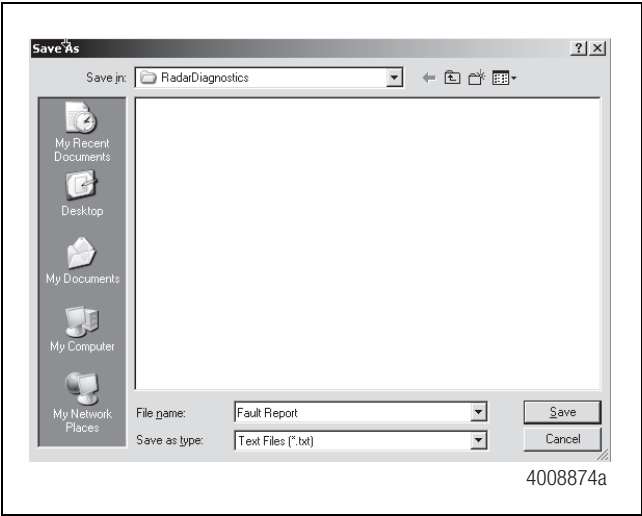


Figure 2.13

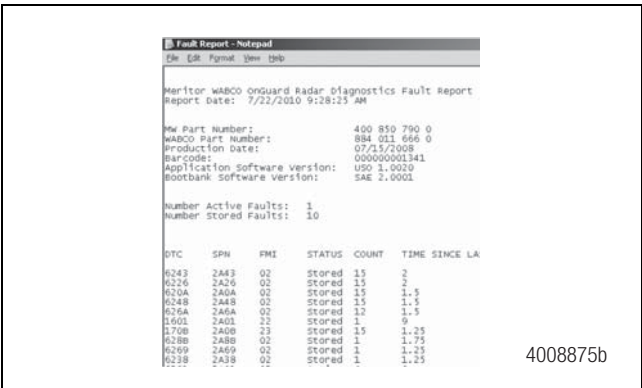


Figure 2.14

Faults can be cleared after generating a fault report. Only stored faults will clear. Figure 2.12.

Recording OnGuard J1939 Data:

1. To access OnGuard Radar J1939 Data, click on “J1939 Bus Data” from the OnGuard Radar Diagnostics home screen. Figure 2.9.

2 Diagnostics, Troubleshooting and Testing

- To capture a log file, click on "Start Logging". Figure 2.15. A single log file will capture up to 5 minutes of information. To pause a log file, click on "Pause"; to resume logging, click on "Resume". Once the required data has been captured, click on "Stop Logging". Figure 2.16.

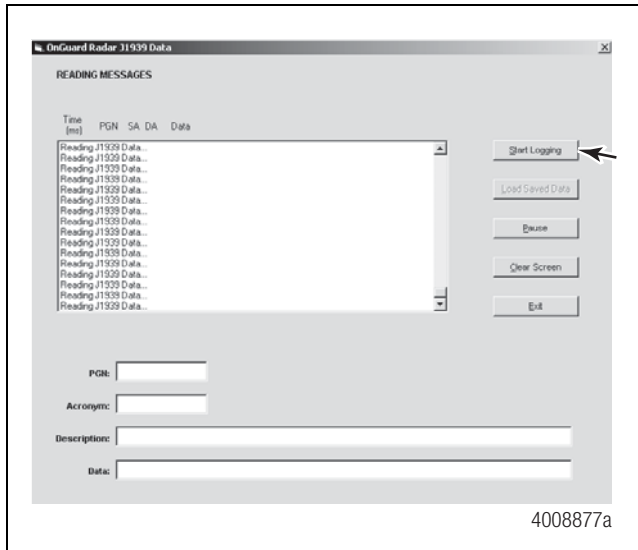


Figure 2.15

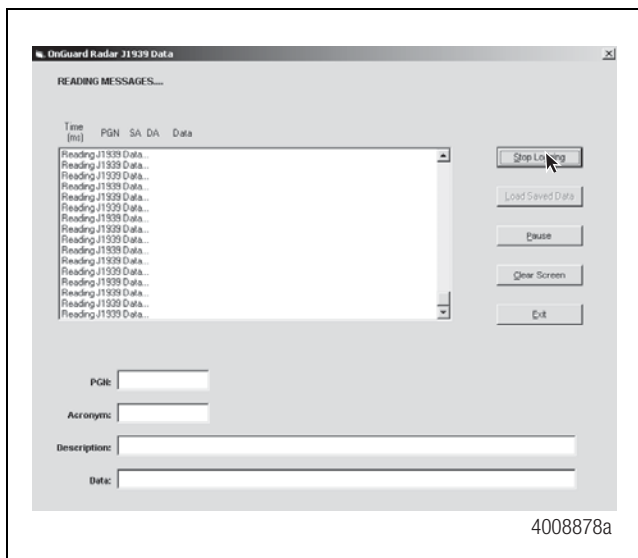


Figure 2.16

- A "Save As" screen will then come up asking you to name the file and select where it will be saved. Figure 2.17. Specific messages can also be viewed after saving the file by clicking on "Load Saved Data", and then highlighting the desired message. Figure 2.18.

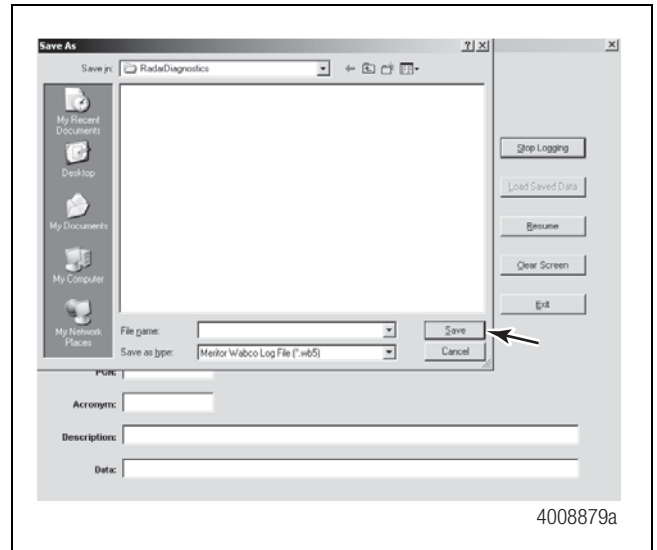


Figure 2.17

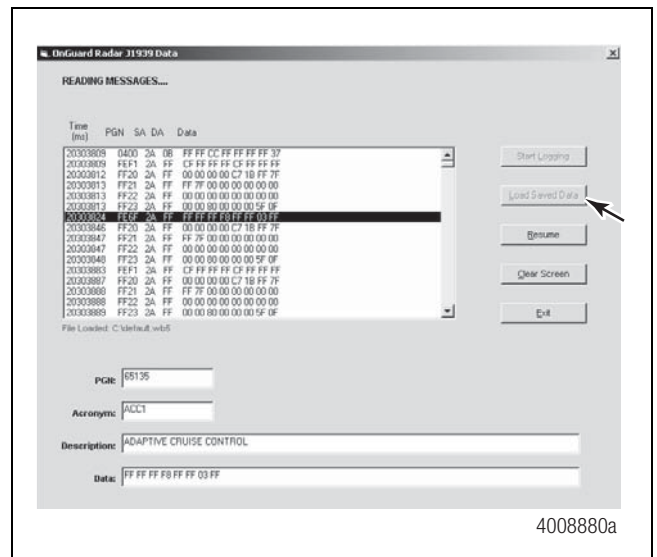


Figure 2.18

2 Diagnostics, Troubleshooting and Testing

Displaying Application Parameters:

1. Certain specific radar application parameters can be viewed and reset using TOOLBOX™ Software. To access this screen, select the “Display” option from the menu.
2. From the pull-down menu, select “Application Parameters” to bring up the “Application Parameters” screen. Figure 2.19.

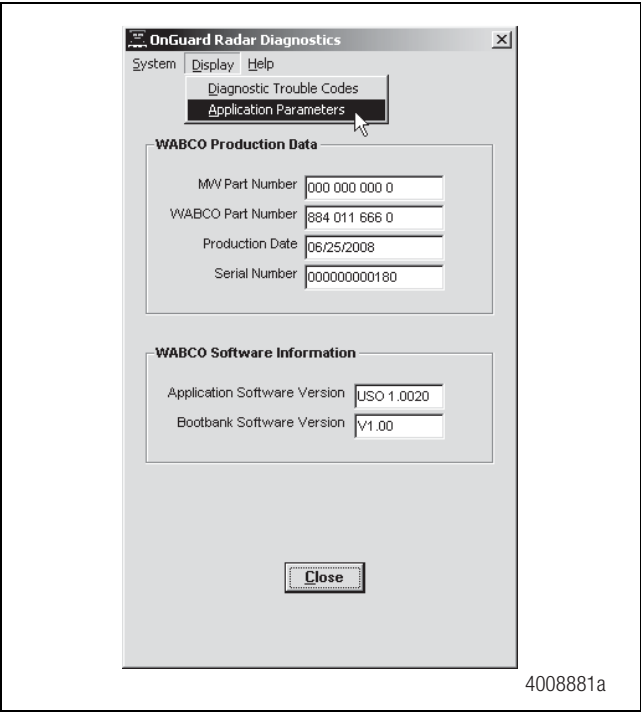


Figure 2.19

3. The Application Parameters screen will then appear. Driveline Retarder, Transmission Type, Air Suspension Front Axle and Air Suspension Rear Axle can all be reset by clicking on “Reset Application Parameters.” Figure 2.20.

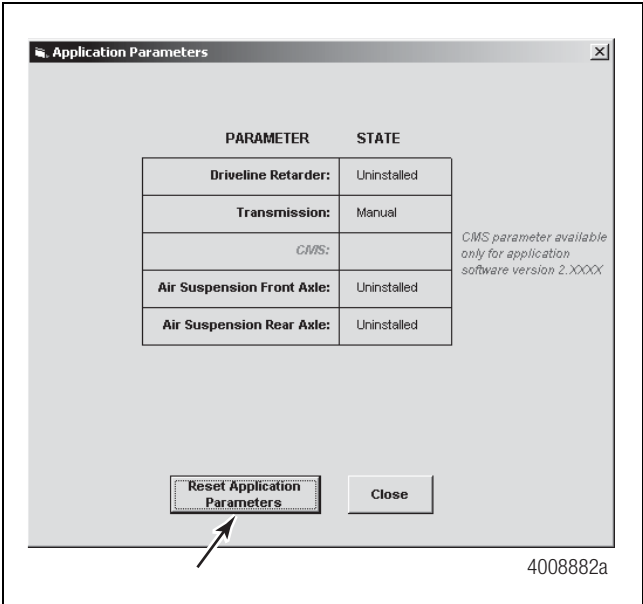


Figure 2.20

4. If the radar software version is USO 1.XXXX, these parameters cannot be reset. A message will then be displayed on the screen explaining this. Figure 2.21.

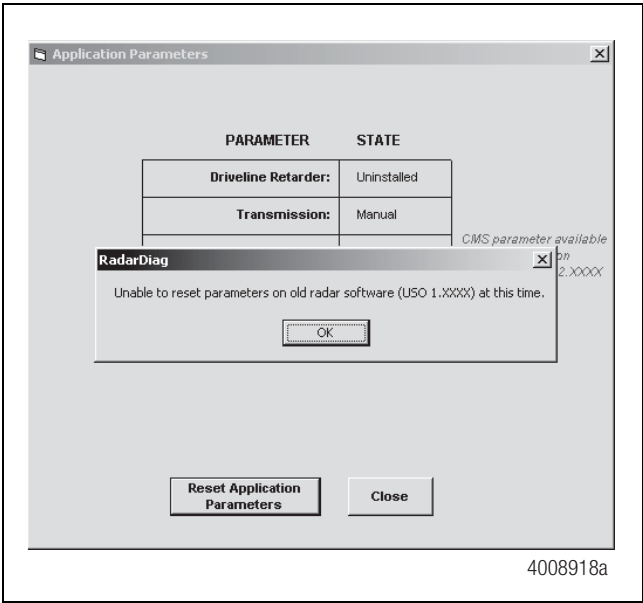


Figure 2.21

2 Diagnostics, Troubleshooting and Testing

5. If the radar software version is USO 2.XXXX, a message will be displayed to show that the parameters have been changed. Figure 2.22. Note that changed parameters are shown in red and the state of CMS cannot be changed. Figure 2.23.

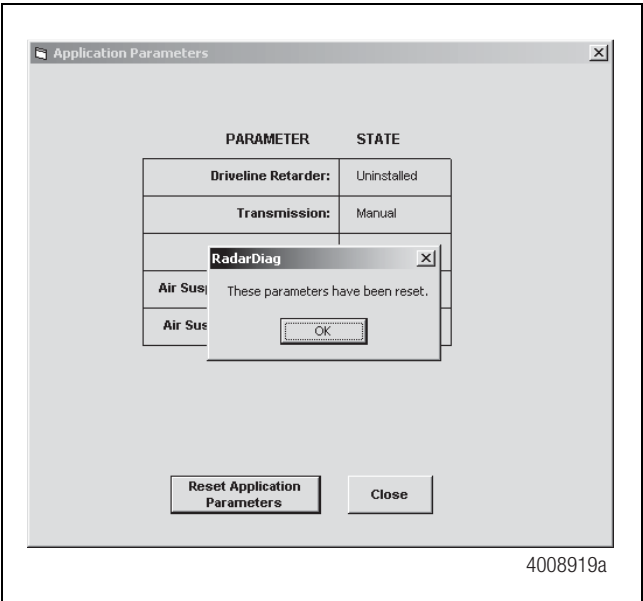


Figure 2.22

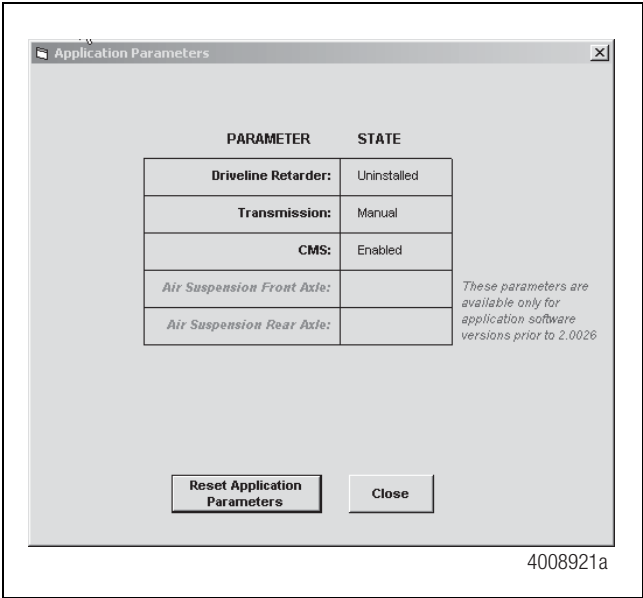


Figure 2.24

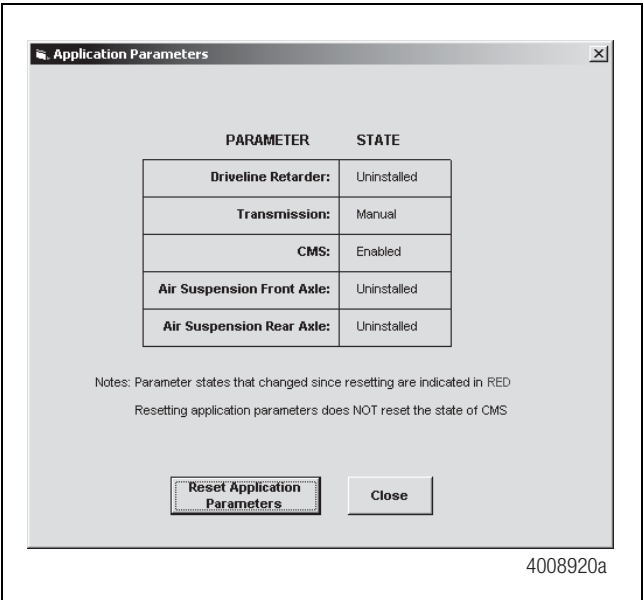


Figure 2.23

6. If the radar software version is USO 2.0026 or higher, the parameters for "Air Suspension Front Axle" and "Air Suspension Rear Axle" are not available. Figure 2.24.

2 Diagnostics, Troubleshooting and Testing

Radar Software Version USO 1.XXXX Fault Code Table

This fault code table is for use with radar sensors that have release USO 1.XXXX software only. Refer to the section Radar Sensor and Display Software Levels to determine the software level. If the display shows a fault code not listed in the table, contact OnTrac Customer Service Center at 866-OnTrac1 (668-7221) for assistance.

Table A: Radar Software Version USO 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A00/02	Datalink Not Connected	J1939 network bus connection error after several restarts at 0.02s, 0.2s, 2.0s and 20s	<ul style="list-style-type: none">• Verify J1939 network bus termination resistors are installed at both ends of the backbone.• Verify all ECUs on the J1939 network bus are transmitting at 250 Kbits/sec.	Radar Harness Troubleshooting
2A01/02	Datalink Not Connected	No J1939 network messages received at all	<ul style="list-style-type: none">• Verify J1939 network is connected to each component.• Verify J1939 Hi and Lo connections are not reversed on any component on the network.• Verify J1939 network bus termination resistors are installed at both ends of the backbone.• Verify J1939 bus resistance is 60 ohms from J1939 Hi to J1939 Lo.• Verify all ECUs on the network are transmitting at 250 Kbits/sec.	Radar Harness Troubleshooting
2A01/22	Radar Memory Error	Radar horizontal alignment error or yaw rate sensor invalid signal	<ul style="list-style-type: none">• Verify condition of radar mounting and hardware.• Realign radar sensor using alignment procedure.• Check display for number of fault occurrences.• If none of the above resolves the issue, contact Meritor OnTrac at 866-668-7221 for further assistance.	Radar System Radar Sensor Alignment
2A01/24	Unlisted DM1 Error	Undefined Error	<ul style="list-style-type: none">• If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance.	Radar System

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A02/02	Cruise Control Msg Timeout	CCVS message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
2A02/22	Unlisted DM1 Error	Radar alignment error	<ul style="list-style-type: none"> • Realign radar using sensor alignment procedure. 	Radar System Radar Sensor Alignment
2A03/02	Cruise Control Data Error	Invalid parking brake switch signal CCVS message	<ul style="list-style-type: none"> • Use the OnGuard display "ACC FUNCTION" screen to determine if the parking brake switch is operational. • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
2A04/02	Cruise Control Data Error	Invalid BRAKE_SWITCH signal CCVS message	<ul style="list-style-type: none"> • Use the OnGuard "ACC FUNCTION" screen to determine if brake switch is operational. • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
2A07/02	Brake Control Data Error	Invalid front axle speed signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A0A/00	Radar Blocked or Dirty	Radar signal attenuation. No target vehicle detected with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> • Determine if radar sensor is blocked by snow, ice or dirt. • Clean surface of fascia and between fascia and radar sensor. • Verify correct fascia is installed correctly. 	Radar System Radar Blocked
2A0A/02	Brake Control Data Error	Invalid brake pedal position % signal in EBC1 message	<ul style="list-style-type: none"> • Use OnGuard display "ACC FUNCTION" screen to verify brake pedal position (BPP) sensor is operational. • ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Inspect BPP sensor harness for damage. • Verify BPP sensor connector is secured. • Check for debris, ice, water, oil, etc., in air system. • Replace BPP sensor if required. • Replace ABS ECU if required. 	ABS System Brake Pedal Position (BPP) Sensor Fault
2A0A/23	Unlisted DM1 Error	Internal radar voltage issue	<ul style="list-style-type: none"> • Cycle the ignition several times, waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If the error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
2A0B/00	Radar Blocked or Dirty	No target detected for 2 minutes with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> • Determine if radar sensor is blocked by snow, ice or dirt. • Clean surface of fascia and between fascia and radar sensor. • Verify correct fascia is installed correctly. 	Radar System Radar Blocked
2A0B/23	Unlisted DM1 Error	Internal Radar Voltage Issue	<ul style="list-style-type: none"> • Cycle the ignition several times, waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If the error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A0C/02	Cruise Control Data Error	Invalid clutch switch signal in CCVS message	<ul style="list-style-type: none"> • Use OnGuard display "ACC FUNCTION" screen to verify Clutch Switch is operational. • Verify correct radar sensor is installed in vehicle. • If manual transmission radar sensor is installed in auto transmission vehicle, fault will occur. 	Component Message Fault Message Data Error
2A19/02	Transmission Control Data Error	Invalid driveline engaged signal in ETC1 message	<ul style="list-style-type: none"> • Use OnGuard display "ACC FUNCTION" screen to verify Driveline Engage is operational. • Verify transmission ECU is functional and has correct parameters and software. • Verify the correct transmission ECU part number is used on this vehicle. • Cycle the ignition to clear faults after transmission servicing. 	Component Message Fault Message Data Error
2A26/02	Brake Control Msg Timeout	EBC1 message timeout > 5 messages	<ul style="list-style-type: none"> • Verify that ABS ECU is connected to the J1939 network. • Verify J1939 network operational. • Verify correct ABS part number is used. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Timeout
2A28/02	Engine Control Msg Timeout	EEC1 message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
2A29/02	Engine Retarder Control Msg Timeout	ERC1ER message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A38/02	Engine Control Data Error	Invalid actual percent torque signal in EEC1 message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
2A40/02	Engine Control Data Error	Invalid engine speed signal in EEC1 message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
2A43/02	Brake Control Msg Timeout	EBC2 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that ABS ECU is connected to the J1939 network. • Verify J1939 network operational. • Verify correct ABS part number is used. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Timeout
2A44/02	Power Supply Undervoltage	Vehicle voltage to radar < 6 VDC	<ul style="list-style-type: none"> • Verify that the voltage at the radar sensor is > 6 VDC when loaded with a headlamp connected across pins 1 and 6 of the radar sensor connector. • Inspect the radar connector for corrosion. • Inspect each of the power connections between the ignition switch and the radar to determine where loss of power may be occurring. 	Electrical System and Harnesses System Voltage Fault
2A45/02	Power Supply Overvoltage	Vehicle voltage to radar > 16 VDC	<ul style="list-style-type: none"> • Monitor the battery voltage to determine if the battery is providing voltage between 10V and 16V. • If the voltage exceeds 16V, troubleshoot the voltage regulator and alternator system. • Also determine if a jump start or battery charging has occurred that could cause a vehicle overvoltage condition. 	Electrical System and Harnesses System Voltage Fault

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A48/02	Brake Control Data Error	Invalid EBS brake switch signal in EBC1 message	<ul style="list-style-type: none"> • Use the OnGuard display “ACC FUNCTION” screen to determine if the brake switch is operating correctly. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
2A49/02	Brake Control Data Error	Invalid COMB_VEHICLE_WEIGHT signal in CVW message	<ul style="list-style-type: none"> • Use OnGuard display “Radar Alignment” screen to verify RSC Mass Estimation is working. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Check ABS ECU for invalid combined vehicle weight message. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
2A4A/02	Engine Control Msg Timeout	EEC2 timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
2A4E/02	Air Suspension Control Msg Timeout	ASC1 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that the ECAS ECU is connected to the J1939 network and is functional. • Verify ECAS is functional and has correct parameters. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Timeout
2A56/02	Transmission Control Msg Timeout	ETC1 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that transmission ECU is connected to the J1939 network. • Verify J1939 network is operational. • Verify correct transmission parameters are downloaded from transmission database. • Cycle the ignition to clear faults after Transmission servicing. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A5F/02	Power Supply Undervoltage	Vehicle voltage to radar < 10 VDC	<ul style="list-style-type: none"> • Verify that the voltage at the radar sensor is >10 VDC when loaded with a headlamp connected across pins 1 and 6 of the radar sensor connector. • Inspect the radar connector for corrosion. • Inspect each of the power connections between the ignition switch and the radar to determine where loss of power may be occurring. 	Electrical System and Harnesses System Voltage Fault
2A60/02	Power Supply Overvoltage	Vehicle voltage to radar > 16 VDC	<ul style="list-style-type: none"> • Monitor the battery voltage to determine if the battery is providing voltage between 10V and 16V. • If the voltage exceeds 16V, troubleshoot the voltage regulator and alternator system. • Also determine if a jump start or battery charging has occurred that could cause a vehicle overvoltage condition. 	Electrical System and Harnesses System Voltage Fault
2A67/02	CAN WBC TRACKING COUNTER	OSEK Task Failure	<ul style="list-style-type: none"> • Cycle the ignition several times, waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If the error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
2A68/02	CAN WBC GYRO ADJUSTMENT	Yaw rate sensor offset calibration error	<ul style="list-style-type: none"> • Cycle the ignition several times, waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If the error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
2A69/02	Engine Control Msg Timeout	CFG_E timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version US0 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A6A/02	Engine Retarder Control Msg Timeout	CFG_ER timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
2A79/02	ACC Display Msg Timeout	ACC2 timeout > 5 messages	<ul style="list-style-type: none"> • Display has stopped sending data. • Intermittent display power or intermittent J1939 network bus. Verify harness is correct. 	Electrical System and Harness Display Message Timeout
2A7A/02	ACC Display Data Error	Invalid requested distance mode signal in ACC2 message	<ul style="list-style-type: none"> • Replace display if necessary. 	Electrical System and Harness Display Message Data Error
2A84/02	Brake Control Data Error	Invalid WHEEL_SPEED_FL signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
2A85/02	Brake Control Data Error	Invalid WHEEL_SPEED_FR signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
2A86/02	Brake Control Data Error	Invalid WHEEL_SPEED_RL signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
2A87/02	Brake Control Data Error	Invalid WHEEL_SPEED_RR signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table A: Radar Software Version USO 1.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
2A8B/02	CAN WBC ARS INIT FAILED	Radar not initialized	<ul style="list-style-type: none"> • Verify no foreign objects are in front of the fascia or between the fascia and radar sensor. Generally this debris is reflective (foil, etc.). • Cycle the ignition and verify correct system operation. • Drive the vehicle at speeds over 10 mph (15 kph) for longer than 30 seconds. • If none of the above resolves the issue, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
2A8E/02	Engine Ignores ACC Control	Engine does not accept TSC1 commands from ACC	<ul style="list-style-type: none"> • Verify correct engine parameters are for ACC. • Reprogram engine parameters if not correct. • Check for multiple faults using OnGuard display. If multiple faults, this is a secondary fault caused by other faults. Correct other faults and cycle ignition to clear this fault. • If single fault, is probably gateway issue. 	Cruise Control System Programming Faults Component Message Fault Engine Ignores ACC Fault
2A8F/02	BPP Sensor Fault	No BPP signal >0 for the last 3 braking maneuvers (< -1.5m/s ²) without ACC active	<ul style="list-style-type: none"> • Use OnGuard display "ACC FUNCTION" screen to verify brake pedal position (BPP) sensor is operational. • Verify the radar sensor software version is USO 1.0015 or greater. If the version is USO 1.0013 or 1.0014, contact Meritor OnTrac at 866-668-7221 for further assistance. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Inspect BPP sensor harness for damage. • Verify BPP sensor is secured. • Check for debris, ice, water, oil, etc., in air system blocking the BPP. • Replace BPP sensor if required. • Replace ABS ECU if required. 	ABS System Brake Pedal Position (BPP) Sensor Fault

Radar Software Version USO 2.XXXX Fault Code Table

This fault code table is for use with radar sensors that have release USO 2.XXXX software only. Refer to the section on Radar Sensor and Display Software Levels to determine the software level. If the display shows a fault code not listed in the table, contact OnTrac Customer Service Center at 866-OnTrac1 (668-7221) for assistance.

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86017/12	Radar Antenna Error	Antenna defect	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86018/12	Radar Antenna Error	Center lobe antenna defect	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86019/12	Radar Antenna Error	Left lobe antenna defect	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86020/12	Radar Antenna Error	Right lobe antenna defect	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86021/12	Radar Antenna Error	Antenna switch defect	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86029/12	Radar Antenna Error	Defective antenna switch	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86030/12	Radar Int Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86031/12	Radar Int Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86032/12	Radar Int Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86033/12	Radar Int Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86034/12	Radar Int Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86035/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86036/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86037/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86038/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86039/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86040/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86041/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86042/12	Radar Int DSP Error	Internal DSP error	<ul style="list-style-type: none"> If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86043/12	Radar EMC Error	External radio frequency interference in frequency range of 199.5 to 200 MHz or hardware defect	<ul style="list-style-type: none"> Determine if external interference depends on time or vehicle location. Move vehicle to another location. Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault
86044/12	Radar Amp Error	Defective STC amplifier	<ul style="list-style-type: none"> If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86045/12	Radar Amp Error	PWM for base amplification control is at its minimum level for an excessive time. Possibly caused by a defect of the STC amplifier or its driver, defect of the RF module or an error in the IF path.	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86046/12	Radar Amp Error	PWM for base amplification control is at its maximum level for an excessive time. Possibly caused by a defect of the STC amplifier or its driver, defect of the RF module or an error in the IF path.	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86047/12	Radar A/D Error	FPGA input offset is too high, possibly caused by a defective analog/digital converter or an erroneous connection between FPGA and ADC	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86048/12	Radar VCO Error	Defective voltage controlled oscillator or its driver, or the IF bandpass filter	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86049/12	Radar A/D Error	Defective bandpass filter or its connections, ADC or connection between ADC and FPGA	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86050/12	Radar VCO Error	Defective VCO	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86051/12	Radar Memory Error	Defective RAM memory	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86052/12	Radar Memory Error	Corrupt EEPROM memory mapping	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86053/12	Radar Memory Error	Corrupt EEPROM and backup data	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86054/12	Radar Memory Error	Corrupt EEPROM data is not backed up	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86055/12	Radar Memory Error	EEPROM mapping is not determinable, or possibly not initialized	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86056/12	Radar Memory Error	Unknown EEPROM mapping identification; write access is blocked	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86057/12	Radar Memory Error	EEPROM write access failure	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86058/12	Radar Memory Error	Corrupt EEPROM data and its backup	<ul style="list-style-type: none"> If this error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86059/12	Radar FPGA Timeout	FPGA timeout	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86060/12	Radar CRC Error	FPGA CRC failure	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86061/12	Radar FPGA State Error	Unknown FPGA state	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86062/12	Radar DSP Error	DSP boot error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86063/12	Radar DSP Error	DSP boot error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86064/12	Radar DSP Error	DSP timeout at boot time	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86065/12	Radar DSP Error	DSP timeout at data initialization	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86066/12	Radar DSP Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86067/12	Radar DSP Comm Error	Internal communication error between DSP and μ C	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86068/12	Radar DSP Error	DSP boot error	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86069/12	Radar DSP Error	DSP boot error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86070/12	Radar DSP Error	Unknown DSP identification	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86071/12	Radar Yaw Error	Because of missing valid yaw rate information, no track can be calculated	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86072/12	Radar Spd Correct Error	Invalid vehicle speed correction value is calculated or read out of EEPROM	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86075/12	Temperature Sensor Error	Defective radar temperature sensor	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86076/12	Radar Timeout Error	Radar antenna A timeout	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86077/12	Radar Timeout Error	Radar antenna B timeout	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86078/12	Radar Timeout Error	Radar antenna C timeout	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86079/12	Radar Timeout Error	Internal timeout	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86080/12	Radar Int Comm Error	Internal communication error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86081/12	Radar Int Comm Error	Internal communication error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86082/12	Radar OSEK Error	OSEK shutdown routine was activated	<ul style="list-style-type: none"> Cycle ignition several times waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. Verify correct system operation. If error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
86083/12	Radar Int Voltage Error	Internal radar voltage issue	<ul style="list-style-type: none"> Cycle ignition several times waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. Verify correct system operation. If error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86084/12	Radar Int Voltage Error	Internal radar voltage issue	<ul style="list-style-type: none"> • Cycle ignition several times waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
86085/12	Radar Int Voltage Error	Internal radar voltage issue	<ul style="list-style-type: none"> • Cycle ignition several times waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
86086/12	Radar Int Voltage Error	Internal radar voltage issue	<ul style="list-style-type: none"> • Cycle ignition several times waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. • Verify correct system operation. • If error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
86087/14	Over Temperature Error	Internal radar sensor temperature exceeds 95°C caused by ambient external temperature > 80°C	<ul style="list-style-type: none"> • Determine if sufficient air is flowing around the radar sensor and through the radiator. • Remove any debris that may be blocking the air flow. • Wait for the system to cool down. • Verify correct system operation. • If error is not cleared, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Over Temperature Fault
86088/12	Radar Programming Error	Missing FLASH memory CRC	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86089/12	Radar Internal Comm Error	Internal communication error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86090/12	Radar Internal Comm Error	Internal communication error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86091/12	Radar Internal Comm Error	Internal communication error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86092/12	Radar Internal Comm Error	Internal communication error	<ul style="list-style-type: none"> • Cycle ignition and verify correct system operation. • If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86093/18	Under Temperature Error	Vehicle speed > 6 mph (10 km/h) and internal temperature < -42°C (-43.6°F)	<ul style="list-style-type: none"> • Radar sensor operating temperature is too low. Operate at temperature > -42°C (-43.6°F). 	Radar System Radar Under Temperature Fault
86094/12	Radar Memory Error	Defective RAM memory	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86095/12	Temperature Sensor Error	Defective radar temperature sensor detected by yaw rate sensor	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86096/12	Yaw Rate Sensor Error	Defective yaw rate sensor	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86097/12	Radar Programming Error	No application software loaded	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86098/12	Radar Programming Error	FLASH memory error	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86099/12	Radar Programming Error	EEPROM memory error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86100/12	Radar Programming Error	Application software version is not allowed	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86101/12	Radar Programming Error	Application software error	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86102/12	Radar Programming Error	Boot loader error	<ul style="list-style-type: none"> Cycle ignition and verify correct system operation. If error occurs again, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86103/12	Radar Programming Error	Corrupt sensor identification data	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86104/12	Radar Diagnostic Error	Invalid diagnostic request	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86105/12	Radar Programming Error	Application software checksum error during download	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86106/12	Radar Programming Error	Memory Block CRC failure	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86107/12	Radar Programming Error	Flash memory CRC failure	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86108/12	Radar Memory Error	ADC EEPROM driver response not equal to OK	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86109/12	Radar Programming Error	Sensor position and/or orientation information is either missing or corrupt	<ul style="list-style-type: none"> If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86110/12	Radar Init Error	Radar Not Initialized	<ul style="list-style-type: none"> Verify no foreign objects are in front of the fascia or between the fascia and radar sensor. Generally this debris is reflective (foil, etc.). Realign the radar sensor using the alignment procedure. Cycle the ignition and verify correct system operation. Drive the vehicle at speeds over 10 mph (15 kph) for longer than 30 seconds. If none of the above resolves the issue, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Reset Fault
86111/10	Radar OSEK Error	OSEK Task Failure	<ul style="list-style-type: none"> Cycle the ignition several times, waiting for the display to turn from a red screen to the blue vehicle screen after several ignition cycles. Verify correct system operation. If the error occurs again after multiple ignition cycles, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Multiple Reset Fault
86166/8	Radar EMC Error	External radio frequency interference in frequency range of 76 to 77 GHz detected with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> Determine if external interference depends on time or vehicle location. Move vehicle to another location. Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault
86167/8	Radar EMC Error	EMC disturbance with vehicle moving > 6mph (10 km/h)	<ul style="list-style-type: none"> Determine if external interference depends on time or vehicle location. Move vehicle to another location. Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86168/8	Radar EMC Error	External radio frequency interference in frequency range of 199.5 to 200 MHz	<ul style="list-style-type: none"> • Determine if external interference depends on time or vehicle location. • Move vehicle to another location. • Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault
86169/8	Radar EMC Error	Strong EMC disturbance	<ul style="list-style-type: none"> • Determine if external interference depends on time or vehicle location. • Move vehicle to another location. • Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault
86170/8	Radar EMC Error	Long term strong EMC disturbance with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> • Determine if external interference depends on time or vehicle location. • Move vehicle to another location. • Turn ignition OFF for several minutes, turn ignition ON. Determine if issue is resolved. 	Radar System Radar RF Interference Fault
86216/4	Power Supply Undervoltage	Vehicle voltage to radar < 6 VDC	<ul style="list-style-type: none"> • Verify that the voltage at the radar sensor is > 6 VDC when loaded with a headlamp connected across pins 1 and 6 of the radar sensor connector. • Inspect the radar connector for corrosion. • Inspect each of the power connections between the ignition switch and the radar to determine where loss of power may be occurring. 	Electrical System and Harnesses System Voltage Fault
86216/3	Power Supply Overvoltage	Vehicle voltage to radar > 16 VDC	<ul style="list-style-type: none"> • Monitor the battery voltage to determine if the battery is providing voltage between 10V and 16V. • If the voltage exceeds 16V, troubleshoot the voltage regulator and alternator system. • Also determine if a jump start or battery charging has occurred that could cause a vehicle overvoltage condition. 	Electrical System and Harnesses System Voltage Fault
86266/19	Datalink Not Connected	J1939 network connection error after several restarts at 0.02s, 0.2s, 2.0s and 20s	<ul style="list-style-type: none"> • Verify J1939 network bus termination resistors are installed at both ends of the backbone. • Verify all ECUs on the J1939 network are transmitting at 250 Kbits/sec. 	Electrical System and Harnesses J1939 Network

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86267/9	Datalink Not Connected	No J1939 network messages received at all	<ul style="list-style-type: none"> • Verify J1939 network is connected to each component. • Verify J1939 Hi and Lo connections are not reversed on any component on the network. • Verify J1939 network bus termination resistors are installed at both ends of the backbone. • Verify resistance is 60 ohms from J1939 Hi to J1939 Lo. • Verify all ECUs on the network are transmitting at 250 Kbits/sec. 	Electrical System and Harnesses J1939 Network
86268/14	Cannot Claim J1939 Address	Not possible to claim source address 0x2a	<ul style="list-style-type: none"> • This fault can only happen if another radar or aftermarket device is connected to J1939 that has same address. • If this fault occurs, remove other radar or aftermarket device. 	Electrical System and Harnesses J1939 Network
86316/9	Cruise Control Msg Timeout	CCVS message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86317/9	Brake Control Msg Timeout	EBC1 message timeout > 5 messages	<ul style="list-style-type: none"> • Verify that ABS ECU is connected to the J1939 network. • Verify J1939 network is operational. • Verify correct ABS part number is used. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Timeout
86318/9	Engine Control Msg Timeout	EEC1 message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86319/9	Brake Control Msg Timeout	EBC2 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that ABS ECU is connected to the J1939 network and is functional. • Verify J1939 network is operational. • Verify correct ABS part number is used. • Cycle the ignition to clear faults after servicing the ABS. 	Component Message Fault Message Timeout
86320/9	Air Suspension Control Msg Timeout	ASC1 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that the ECAS ECU is connected to the J1939 network and is functional. • Verify ECAS is functional and has correct parameters. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Timeout
86321/9	Driveline Retarder Control Msg Timeout	ERC1_DR timeout > 5 messages	<ul style="list-style-type: none"> • Verify that Driveline Retarder ECU is connected to the J1939 network. • Verify J1939 network is operational. • Possible fault during Driveline Retarder diagnostics. Cycle ignition. 	Component Message Fault Message Timeout
86322/9	Transmission Control Msg Timeout	ETC1 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that transmission ECU is connected to the J1939 network. • Verify J1939 network is operational. • Verify correct transmission parameters are downloaded from transmission database. • Cycle the ignition to clear faults after transmission servicing. 	Component Message Fault Message Timeout
86323/9	Tachograph Msg Timeout	TCO1 timeout > 5 messages	<ul style="list-style-type: none"> • Verify that tachograph is connected to the J1939 network. • Verify J1939 network is operational. • Verify correct tachograph parameters. • Possible fault during tachograph diagnostics. Cycle ignition. 	Component Message Fault Message Timeout
86324/9	Brake Control Msg Timeout	EBC5 message timeout > 5 messages	<ul style="list-style-type: none"> • Verify that ABS ECU is connected to the J1939 network. • Verify J1939 network is operational. • Verify correct ABS part number is used. • Possible fault during ABS diagnostics. Cycle ignition. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86325/9	Engine Control Msg Timeout	CFG_E timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86326/9	Driveline Retarder Control Msg Timeout	CFG_DR timeout > 5 messages	<ul style="list-style-type: none"> • Verify that Driveline Retarder ECU is connected to the J1939 network. • Verify J1939 network is operational. • Possible fault during Driveline Retarder diagnostics. Cycle ignition. 	Component Message Fault Message Timeout
86329/9	ACC Display Msg Timeout	ACC2 timeout > 5 messages	<ul style="list-style-type: none"> • Display has stopped sending data. • Intermittent display power or intermittent J1939 data link. Verify harness is correct. 	Electrical System and Harnesses Display Message Timeout
86330/9	Virtual Target Message Timeout Error	VTRGT timeout > 5 messages	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Message Fault Message Timeout
86331/9	Engine Retarder Control Msg Timeout	CFG_ER timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86332/9	Engine Retarder Control Msg Timeout	ERC1 ER message timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86333/9	Engine Control Msg Timeout	EEC2 timeout > 5 messages	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86334/9	Cruise Control Msg Timeout	Timeout CCVS second source	<ul style="list-style-type: none"> • Verify vehicle body or chassis ECU is functional and has correct parameters and software per OEM specifications. • Verify the correct vehicle body or chassis ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86335/9	Cruise Control Msg Timeout	Timeout CCVS3	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the J1939 network is operational. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Timeout
86366/19	ACC Display Data Error	Invalid requested distance mode signal in ACC2 message	<ul style="list-style-type: none"> • Replace display if necessary. 	Electrical System and Harnesses Display Message Data Error
86367/19	ACC Display Data Error	Invalid ACC activation demand signal in ACC2 message	<ul style="list-style-type: none"> • Replace display if necessary. 	Electrical System and Harnesses Display Message Data Error
86368/19	Air Suspension Control Data Error	Invalid Above Front signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS front axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error
86369/19	Air Suspension Control Data Error	Invalid Below Front signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS front axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86370/19	Air Suspension Control Data Error	Invalid Above Rear signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS rear axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error
86371/19	Air Suspension Control Data Error	Invalid below Rear signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS rear axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error
86372/19	Air Suspension Control Data Error	Invalid nominal level Rear axle signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS rear axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error
86373/19	Air Suspension Control Data Error	Invalid nominal level front axle signal in ASC1 message	<ul style="list-style-type: none"> • Verify ECAS is functional and has correct parameters and software. • Verify the ECAS part number is used on this vehicle. • Troubleshoot ECAS front axle. • Cycle the ignition to clear faults after ECAS servicing. 	Component Message Fault Message Data Error
86374/19	Cruise Control Data Error	Invalid parking brake switch signal CCVS message	<ul style="list-style-type: none"> • Use the OnGuard display "COMPONENT TEST" screen to determine if the parking brake switch is operational. • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86375/19	Cruise Control Data Error	Invalid clutch switch signal in CCVS message	<ul style="list-style-type: none"> • Use the OnGuard display "COMPONENT TEST" screen to determine if the clutch switch is operational. • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86376/19	Cruise Control Data Error	Invalid CC state signal in CCVS message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86377/19	Cruise Control Data Error	Invalid CC active signal in CCVS message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86378/19	Cruise Control Data Error	Invalid CC set speed signal in CCVS message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86379/19	Engine Control Data Error	Invalid Reference Torque signal in EC message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86380/19	Engine Control Data Error	Invalid minimum engine speed signal in EC message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86381/19	Driveline Retarder Control Data Error	Invalid reference torque signal in RC_DR message	<ul style="list-style-type: none"> • Verify driveline retarder ECU is functional and has correct parameters and software. • Verify the correct driveline retarder ECU part number is used on this vehicle. • Cycle the ignition to clear faults after driveline retarder servicing. 	Component Message Fault Message Data Error
86383/19	Brake Control Data Error	Invalid EBS brake switch signal in EBC1 message	<ul style="list-style-type: none"> • Use the OnGuard display "COMPONENT TEST" screen to determine if the brake switch is operating correctly. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
86384/19	Brake Control Data Error	Invalid ABS fully operational signal in EBC1 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
86385/19	Brake Control Data Error	Invalid front axle speed signal in EBC2 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
86386/19	Brake Control Data Error	Invalid system state signal in EBC5 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86387/19	Brake Control Data Error	Invalid acceleration limit signal in EBC5 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
86388/19	Brake Control Data Error	Invalid foundation brake use signal in EBC5 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS servicing. 	Component Message Fault Message Data Error
86390/19	Engine Control Data Error	Invalid actual percent torque signal in EEC1 message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86391/19	Engine Data Error	Invalid engine speed signal in EEC1 message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86395/19	Driveline Retarder Data Error	Invalid actual retarder percent torque signal in ERC1_DR message	<ul style="list-style-type: none"> • Verify driveline retarder ECU is functional and has correct parameters and software. • Verify the correct driveline retarder ECU part number is used on this vehicle. • Cycle the ignition to clear faults after driveline retarder servicing. 	Component Message Fault Message Data Error
86396/19	Driveline Retarder Control Data Error	Invalid retarder selection, non engine signal in ERC1_DR message	<ul style="list-style-type: none"> • Verify driveline retarder ECU is functional and has correct parameters and software. • Verify the correct driveline retarder ECU part number is used on this vehicle. • Cycle the ignition to clear faults after driveline retarder servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86397/19	Driveline Retarder Control Data Error	Invalid actual maximum available retarder percent torque signal in ERC1_DR message	<ul style="list-style-type: none"> • Verify driveline retarder ECU is functional and has correct parameters and software. • Verify the correct driveline retarder ECU part number is used on this vehicle. • Cycle the ignition to clear faults after driveline retarder servicing. 	Component Message Fault Message Data Error
86398/19	Transmission Control Data Error	Invalid shift in process signal in ETC1 message	<ul style="list-style-type: none"> • Verify transmission ECU is functional and has correct parameters and software. • Verify the correct transmission ECU part number is used on this vehicle. • Cycle the ignition to clear faults after transmission servicing. 	Component Message Fault Message Data Error
86399/19	Transmission Control Data Error	Invalid driveline engaged signal in ETC1 message	<ul style="list-style-type: none"> • Verify transmission ECU is functional and has correct parameters and software. • Verify the correct transmission ECU part number is used on this vehicle. • Cycle the ignition to clear faults after transmission servicing. 	Component Message Fault Message Data Error
86402/19	Virtual Target Distance Error	Invalid distance signal in VTRGT message	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86403/19	Virtual Target Rel Speed Error	Invalid relative speed signal in VTRGT message	<ul style="list-style-type: none"> • If error occurs, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Component Replacement Radar Sensor Replacement
86404/19	Engine Control Data Error	Invalid accelerator pedal position signal in EEC2 message	<ul style="list-style-type: none"> • Use OnGuard display "COMPONENT TEST" screen to verify accelerator pedal position sensor is operational. • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86405/19	Brake Control Data Error	Invalid brake pedal position % signal in EBC1 message	<ul style="list-style-type: none"> • Use OnGuard display "COMPONENT TEST" screen to verify brake pedal position (BPP) sensor is operational. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Inspect BPP sensor harness for damage. • Verify BPP sensor connector is secured. • Check for debris, ice, water, oil, etc., in air system. • Replace BPP sensor if required. • Replace ABS ECU if required. 	ABS System Brake Pedal Position Sensor
86406/19	Engine Retarder Control Data Error	Invalid ER_ACT_PERCENTAGE signal in ERC1 message	<ul style="list-style-type: none"> • Verify engine ECU is functional and has correct parameters and software downloaded from the engine database. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86407/19	Cruise Control Data Error	Invalid signal <set switch> in CCVS message	<ul style="list-style-type: none"> • Verify engine or vehicle body/chassis ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86408/19	Cruise Control Data Error	Invalid signal <resume switch> in CCVS message	<ul style="list-style-type: none"> • Verify engine or vehicle body/chassis ECU is functional and has correct parameters and software. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version USO 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86409/19	Unlisted DM1 Error or Cruise Control Data Error	Invalid signal <pause switch> in CCVS message	<ul style="list-style-type: none"> • Verify engine or vehicle body/chassis ECU is functional and has correct parameters and software per OEM specifications. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86411/19	Unlisted DM1 Error or Cruise Control Data Error	Invalid signal <vehicle speed> in CCVS message	<ul style="list-style-type: none"> • Verify engine or vehicle body/chassis ECU is functional and has correct parameters and software per OEM specifications. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86412/19	Cruise Control Data Error	Invalid signal <cruise control low set limit speed> in CCVS message	<ul style="list-style-type: none"> • Check cruise control minimum speed setting on engine ECU. • Verify the correct engine ECU part number is used on this vehicle. • Cycle the ignition to clear faults after engine servicing. 	Component Message Fault Message Data Error
86416/13	Yaw Offset or H Align Error	Radar horizontal alignment error or yaw rate sensor invalid signal	<ul style="list-style-type: none"> • Verify the condition of the radar mounting and hardware. • Realign the radar sensor using the alignment procedure. • Check the display for the number of fault occurrences. • If none of the above resolves the issue, contact Meritor OnTrac at 866-668-7221 for further assistance. 	Radar System Radar Sensor Alignment
86417/13	Radar H Alignment Error	Radar alignment error	<ul style="list-style-type: none"> • Realign radar using sensor alignment procedure. 	Radar System Radar Sensor Alignment
86466/7	Suspension Height Error	Air suspension is not at normal driving level	<ul style="list-style-type: none"> • Adjust ECAS driving height parameter. 	Component Message Fault Message Data Error

2 Diagnostics, Troubleshooting and Testing

Table B: Radar Software Version US0 2.XXXX Fault Code Table

Fault Code SPN/FMI	Displayed Description	Fault Description	Repair Instructions	Troubleshooting Section Sub-Section
86516/14	Radar Blocked or Align	Radar signal attenuation. No target vehicle detected with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> • Determine if radar sensor is blocked by snow, ice or dirt. • Clean surface of fascia and between fascia and radar sensor. • Verify correct fascia is installed correctly. 	Radar System Radar Blocked
86517/14	Radar Blocked or Align	No target detected for 2 minutes with vehicle moving > 6 mph (10 km/h)	<ul style="list-style-type: none"> • Determine if radar sensor is blocked by snow, ice or dirt. • Clean surface of fascia and between fascia and radar sensor. • Verify correct fascia is installed correctly. 	Radar System Radar Blocked
86566/12	Engine Ignores ACC Control	Engine does not accept TSC1 commands from ACC	<ul style="list-style-type: none"> • Verify correct engine parameters are for ACC. • Reprogram engine parameters if not correct. • Check for multiple faults using OnGuard display. If multiple faults, this is a secondary fault caused by other faults. Correct other faults and cycle ignition to clear this fault. • If single fault, is probably gateway issue. 	Cruise Control System Programming Faults Component System Fault Engine Ignores ACC Control Fault
86567/1	Brake Control Data Error	Invalid ABS fully operational signal in EBC1 message	<ul style="list-style-type: none"> • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Cycle the ignition to clear faults after ABS service. 	Component Message Fault Message Data Error
86616/7	BPP Sensor Fault	No BPP signal >0 for the last 3 braking maneuvers (< -1.5m/s ²) without ACC active	<ul style="list-style-type: none"> • Use OnGuard display "ACC FUNCTION" screen to verify brake pedal position (BPP) sensor is operational. • Verify ABS ECU is functional. • Verify the correct ABS ECU part number is used on this vehicle. • Inspect BPP sensor harness for damage. • Verify BPP sensor is secured. • Check for debris, ice, water, oil, etc., in air system blocking the BPP. • Replace BPP sensor if required. • Replace ABS ECU if required. 	ABS System Brake Pedal Position (BPP) Sensor Fault

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Release all air from the air systems before you remove any components. Pressurized air can cause serious personal injury. Refer to the vehicle manufacturer's service manual for instructions.

Radar Inspection and Preventive Maintenance

Radar Inspection

NOTE: It is recommended to perform the radar inspection process any time normal preventive maintenance is performed on the vehicle.

1. If the radar harness connector is on the top of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the top and is rightside up. If the radar harness connector is on the bottom of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the bottom and is rightside up. If the fascia has a "chin" rather than the "OnGuard" wording, the "chin" should be oriented over the radar connector, either on the top or on the bottom respectively.
2. Remove the fascia and look at the bumper positioning. Check if the bumper is physically touching the radar sensor or mounting bracket at any point.
 - **If the bumper is touching the fascia:** Reposition the bumper so there is a minimum of 1/4-inch (6.35 mm) clearance between it and the fascia at all points.

3. Visually inspect the radar connector, housing, ball socket clips, screws, through-hole adjusters and rivets for any damage. Inspect the top and bottom edge of the radar for any signs of wear or prior contact with the bumper. Also, inspect the routing of the radar sensor harness to ensure it is not pinched in the bumper or damaged at any point. For Century Class tractors, refer to Meritor WABCO PIL 504 for more information. The rubber boot on the radar harness connector must be fully covering the connector.
4. Grab onto the radar sensor and gently wiggle it back and forth. You should not feel any slack or movement in the screws, ball socket clips, through-hole adjusters or rivets. The radar sensor should be securely mounted at all three positions.
5. If the radar passes all of these inspections, verify correct vertical and horizontal alignment according to the Radar Sensor Alignment procedure in this section.

Radar System Troubleshooting

Refer to Fault Code Table A and Table B for further information.

The following sections and sub-sections are the troubleshooting sections and sub-sections referenced in the last column of Fault Code Tables A and B.

Radar Sensor Connector Corrosion

Radar sensor connector corrosion has been found on vehicles where the radar sensor connector or protective rubber boot has been incorrectly installed following service. When the connector is not fully seated during installation or repair activities, water, corrosive road salts or other contaminants can enter the radar sensor connector. When salt water interacts with electrical current, corrosion occurs quickly. When this occurs, severe corrosion can occur on the radar sensor and harness pins. If this corrosion is not detected early enough, a fault may be generated and the radar sensor and radar sensor harness may need to be replaced.

Corrosion in the connector may also occur if the radar sensor harness becomes damaged somewhere along the length of the harness. Water and corrosive road salts can wick down the harness and into the radar sensor connector. If damage to the harness is detected early enough, damage to the radar sensor connector can be avoided.

2 Diagnostics, Troubleshooting and Testing

Radar Blocked

The radar sensor is protected by a fascia. The fascia and the radar sensor must not be blocked in any manner. The radar sensor can become blocked by snow, ice, dirt or other foreign matter. If this occurs, the radar sensor will have limited or no functionality. If a "Radar Blocked" fault occurs, perform the following procedure:

1. Determine if the radar sensor is blocked by snow, ice, dirt or anything else.
2. Clean the surface of the fascia and between the fascia and the radar sensor. Remove any packed snow or ice that may form in this area.
3. Verify that the radar electrical harness is not hanging in front of the sensor.
4. Verify that the radar sensor is aligned correctly. Refer to the Radar Alignment procedure in this section.
5. Verify the fascia is installed and oriented correctly.
6. Cycle the ignition OFF for 1 minute to clear the fault. The vehicle must be driven for up to 90 minutes to determine if the fault has been corrected.
7. If the fault re-occurs, refer to the Radar Sensor Replacement procedure in Section 3.

Radar Sensor Alignment

If the radar sensor is not aligned correctly, the system may:

- Track targets that are not directly ahead of the vehicle.
- Not track vehicles within the expected range of the system.

The radar must be correctly aligned in two axes for correct operation (vertically and horizontally).

NOTE: The radar alignment screws may be a T15 or a T20 Torx head. Using the incorrect size will result in damage and difficulty in removing. If damage to the Torx head occurs, replace with T20 Torx screws. Take care not to use excessive torque on the screws, thereby stripping the heads.

1. The vehicle must be parked on a flat level surface. The suspension must be at a standard ride height (air system fully charged for air-suspended vehicles).
2. Before starting the alignment procedure, visually verify that all three radar alignment screws are fully seated in the screw ball sockets, the ball sockets are not damaged or missing and the radar sensor is not loose.

To correctly inspect the integrity of the radar mounting hardware, hold on to the radar and wiggle it back and forth. There should not be any physical or visual movement or slack in the radar, ball socket clips, screws, through-hole adjusters or rivets. Ensure there is at least 1/4-inch (6.35 mm) of clearance between the radar sensor and the bumper in all directions. Contact between the radar sensor and bumper can cause damage to the through-hole adjusters, ball socket clips and radar screws. Adjust, repair or replace the screws, ball socket clips or through-hole adjusters as necessary.

Depending on vehicle make and model, radar units may be mounted with the connector on top or with the connector on the bottom. This changes the location of the horizontal and vertical sensor adjustment screws. Figure 2.25.

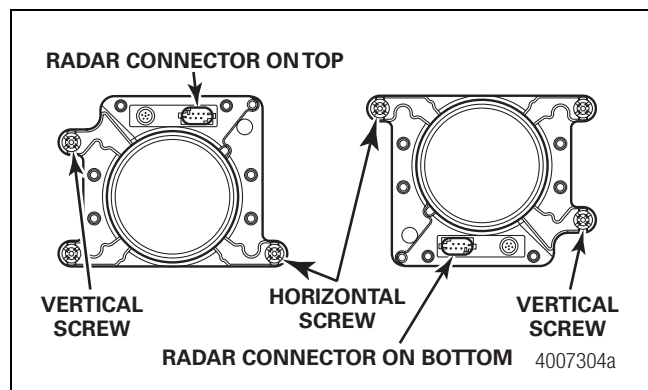


Figure 2.25

3. Remove the radar fascia from the front of the vehicle. Figure 2.26.

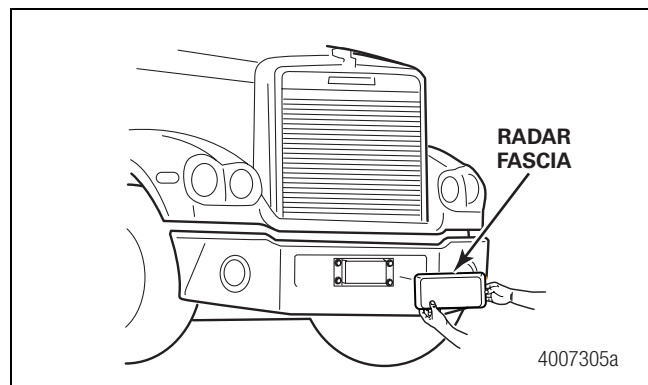


Figure 2.26

2 Diagnostics, Troubleshooting and Testing

- Set vertical alignment using a digital level. Figure 2.27. Set the digital level flat on the tool reference surface of the sensor and press ZERO to set the level to 0.0 degrees. The tool reference surface must be level with the surface under the vehicle tires. (One source for a digital level is <http://www.wixey.com/anglegauge/index.html>: Model Wixey WR 300.)

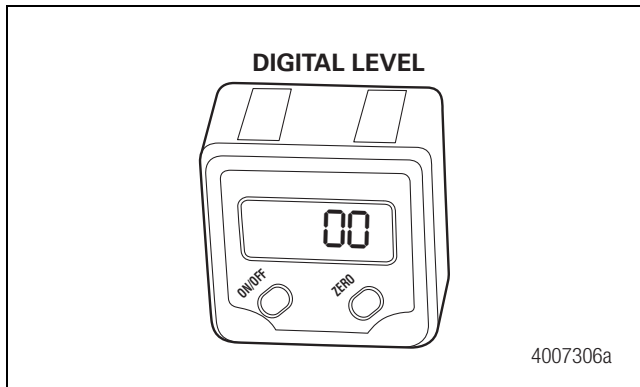


Figure 2.27

- Position the digital level on the outside metal edge of the radar sensor surface. Figure 2.28. Adjust the vertical alignment screw until the digital level reads 90.0 ± 0.1 degrees.

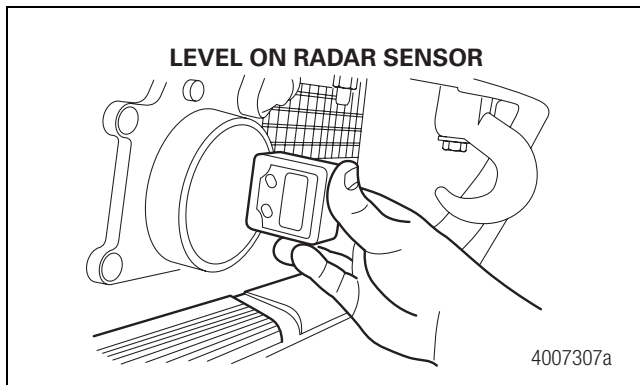


Figure 2.28

- For horizontal alignment, the vehicle must be driven and a target vehicle must be tracked. Start the engine and select the OnGuard Driver Display "Radar Alignment" screen by pressing the "MODE" button twice. Figure 2.29 and Figure 2.30.

Drive on a smooth, level and straight road with traffic. Watch the sliding indicator bar on the screen. A Green screen indicates the target is being tracked, a Blue screen indicates the radar is searching and no target is being tracked.

- Only when there is a Green screen can the sliding bar be used to determine the need for adjustment.
- Allow several seconds for the indicator to settle into one position after the screen turns green.
- The indicator will move if the vehicle or target change their relative position while driving. For best results, attempt to remain centered in the lane without moving from side to side.

NOTE: When tracking a target vehicle, allow the distance to gradually increase to at least 300 feet (91 meters) and wait for the indicator to settle before making any adjustments to the horizontal alignment screw. Making any horizontal adjustments based on following distances less than 300 feet (91 meters) could cause the radar to be incorrectly aligned.

NOTE: If the radar will not track a vehicle out to at least 300 feet (91 meters), it is a good indication that the radar is severely misaligned.

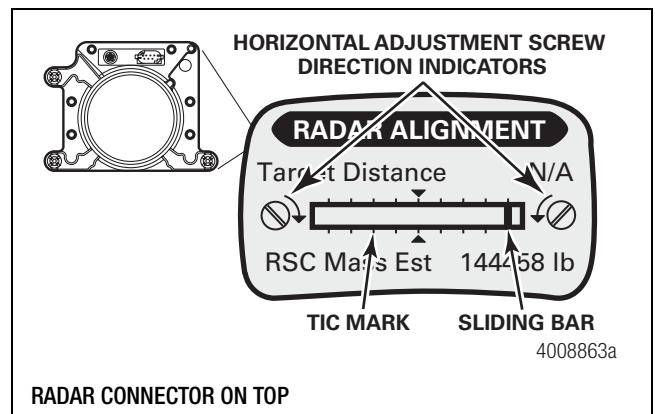


Figure 2.29

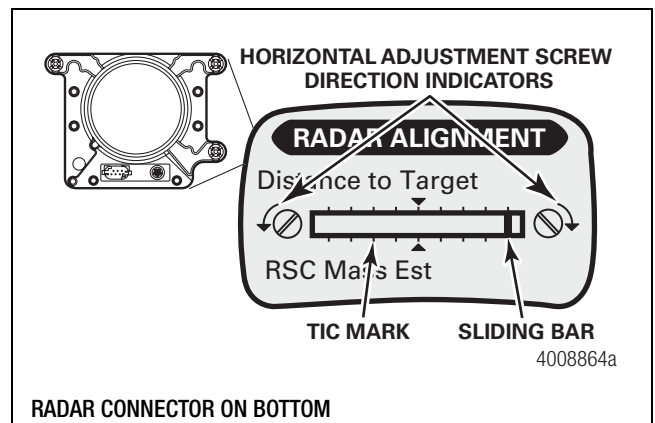


Figure 2.30

2 Diagnostics, Troubleshooting and Testing

The sliding bar indicates whether the horizontal alignment screw must be adjusted. The horizontal alignment screw on the radar must be turned in the direction indicated at the end of the scale on the display. Each “tic” mark represents one full turn of the horizontal alignment screw. Note the position of the sliding indicator and count the number of marks to the center arrows when tracking a vehicle.

Turn the horizontal alignment screw on the radar one full turn counterclockwise or clockwise for each mark counted. Repeat the procedure until the slider bar is within ± 1 mark of the center arrows on the OnGuard Radar Alignment screen. After completing the alignment, attach the fascia and verify radar alignment tracking to 350-400 feet on a smooth, level and straight road. If the distance to target is less than 350 feet, readjust the vertical alignment. Typically, in this case, the radar alignment must be adjusted to aim the radar higher.

Radar RF Interference Fault

On rare occasions the OnGuard Collision Safety System may experience radio frequency interference issues. If a radio interference fault code is detected, the following should be performed:

1. Cycle the ignition OFF for several minutes and then back ON. Observe the display for correct system operation. If the fault does not re-occur, the repair is completed.
2. If the fault does re-occur, move the vehicle to another location at least 1/4 mile from the current location.
3. Cycle the ignition OFF for several minutes and then back ON. Observe the display for correct system operation. If the fault does not re-occur, the repair is completed.
4. If the fault re-occurs, replace the radar per the Radar Sensor Replacement procedure.

Radar Reset Fault

On rare occasions a sensor reset fault may occur. If this occurs, the radar sensor may need to be restarted to recover from system issues. Perform the following if a sensor reset fault code is present:

1. Cycle the ignition OFF and then back ON. Observe the display for correct system operation. If the fault does not re-occur, the repair is completed.
2. If the fault re-occurs, replace the radar sensor per the Radar Sensor Replacement procedure in Section 3.

Radar Multiple Reset Fault

On rare occasions the radar sensor may need to be restarted multiple times to recover from certain system issues. Perform the following if a sensor multiple reset fault code is present:

1. Cycle the ignition from OFF to ON several times. Wait for the display to turn from a red screen to the blue vehicle screen between each ignition cycle. If the fault does not re-occur after the completion of five ignition cycles, the repair is completed.
2. If the fault re-occurs, replace the radar sensor per the Radar Sensor Replacement procedure.

Radar Over Temperature Fault

During vehicle operation it is possible to block the flow of air across the radar sensor and the radiator. If this occurs, the radar sensor may become overheated causing an Over Temperature fault code. This may occur if the radar sensor is above 80°C (176°F). Perform the following if a radar over temperature fault code is present:

1. Determine if the radar sensor may have been exposed to excessive temperature during vehicle operation. If the vehicle became overheated (i.e., loss of engine coolant, severe hill climbs followed by stopping, etc.), allow the vehicle to cool down to normal operating temperature. Turn the ignition ON and determine if the over temperature fault code is still present. If not present, the repair is complete.
2. Inspect the area around the sensor for debris that may have become lodged. Remove the debris if found. Allow the vehicle to cool down to normal operating temperature. Turn the ignition ON and determine if the over temperature fault code is still present. If not present, the repair is complete.
3. If the fault re-occurs, replace the radar sensor per the Radar Sensor Replacement procedure.

Radar Under Temperature Fault

During vehicle operation at extremely low temperatures it is possible to observe a radar sensor low temperature fault. This will occur when the radar sensor is exposed to temperatures at or below -42°C (-43.6°F). Perform the following if the radar under temperature fault code is present:

1. Move the vehicle into a location with the temperature warmer than 60°F. Verify that no ice or snow is surrounding the radar sensor.
2. Allow the vehicle to warm up for one hour.

2 Diagnostics, Troubleshooting and Testing

3. Turn the ignition ON and determine if the under temperature fault code is still present. If not present, the repair is complete.
4. If the fault re-occurs, replace the radar sensor per the Radar Sensor Replacement procedure in Section 3.

Electrical System and Harnesses Troubleshooting

Refer to Table A and Table B for further information.

The following sections and sub-sections are the troubleshooting sections and sub-sections referenced in the last column of Fault Code Tables A and B.

The following procedures require a multi-meter. Note that during pin probing, damage to connector pins can result if the probe exceeds the recommended maximum diameter. For the radar sensor, the maximum diameter is 0.015 inch (1/64 inch). For the OnGuard Display connector, the maximum diameter is 0.03 inch (1/32 inch).

Harness Routing and Associated Wire Fatigue or Abrasion

Wire fatigue will occur at any harness location where sufficient harness motion allows bending of the wiring. When this occurs, individual harness wires become weakened and can break. The harness can have intermittent or permanent open circuit failures causing the OnGuard Collision Safety System to malfunction.

Harness abrasion will occur at any harness location where sufficient harness motion allows rubbing of the harness against adjacent vehicle components. When this occurs, the outer harness jacket and the individual wire insulation can wear, causing short circuits between each of the exposed wires or to the vehicle chassis causing the OnGuard Collision Safety System to malfunction. The harness is especially susceptible to wear when the harness rubs against a sharp edge.

Both wire fatigue and harness abrasion can be prevented by correctly attaching the harness to the chassis at closely spaced intervals while avoiding contact with sharp edges. The harness should be secured with tie wraps every two feet or less in areas where damage may occur. Tie wraps should be tightened with a tie wrap gun set to the appropriate setting to correctly secure the harness without allowing a loose mounting but also not causing the harness to be over-tightened. Over-tightening the tie wrap to the harness can crush the harness jacket and conductors causing harness damage and system failures.

At the radar sensor connector location, a harness clip correctly locates the harness. The harness clip provides a secure mounting of the harness to ensure the wiring near the connector does not fatigue. Harnesses installed without this harness clip correctly installed can become damaged near the radar sensor connector.

Radar Harness Electrical Checks

The radar harness is connected to the radar sensor using a six pin connector. Figure 2.31. The following harness check should be followed when various fault codes occur. Refer to Troubleshooting Guide, Table A and Table B for further information.

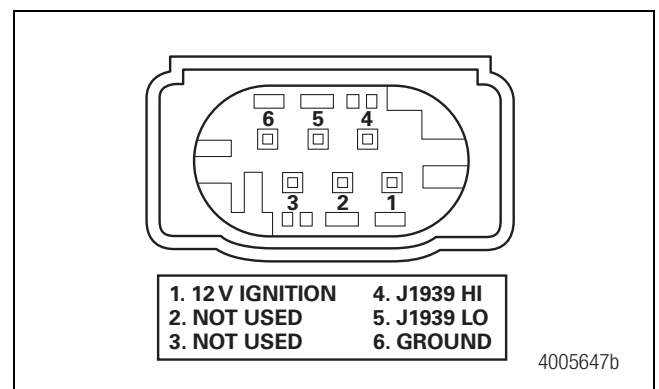


Figure 2.31

Disconnect the radar harness connector and perform the following procedures.

1. Key On/Engine Off — Check Pin 1 (power) to Pin 6 (ground) for 12 volts.
 - If the power shows 12 volts, go to step 2.
 - If the power is less than 12 volts, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. If any damage is found, repair and replace as necessary.
2. Key Off/Engine Off — Check Pin 6 (ground) to chassis for resistance of less than 1 ohm.
 - If the resistance is less than 1 ohm, go to step 3.
 - If the resistance is higher than 1 ohm, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. Over tightened tie wraps may cause this type of damage. If any damage or corrosion is found, repair and replace as necessary. Clean connector corrosion using electrical contact cleaner.

2 Diagnostics, Troubleshooting and Testing

3. Key On/Engine Off — Perform a load test across Pins 1 and 6 by connecting a 12-volt headlight or test lamp to the pins.
 - If the lamp illuminates correctly, go to step 4.
 - If the lamp does not illuminate, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. Over tightened tie wraps may cause this type of damage. If any damage or corrosion is found, repair and replace as necessary. Clean connector corrosion using electrical contact cleaner.
4. Key Off/Engine Off — Check across Pins 4 and 5 (SAE J1939) for resistance of 60 ohms.
 - If the resistance between Pins 4 and 5 is greater than 120 ohms, check if both SAE J1939 circuits are open or if both termination resistors are missing.
 - If the resistance between Pins 4 and 5 is equal to 120 ohms, one of the SAE J1939 circuits is open or one of the termination resistors is missing.
 - If the resistance between Pins 4 and 5 is less than 60 ohms, more than two termination resistors are installed, the SAE J1939 harness is shorted or one or more ECUs on the SAE J1939 network are damaged. If so, remove each ECU connected to the SAE J1939 network one by one until the bus resistance returns to 60 ohms. Repair and replace as necessary.

NOTE: Make sure to check the firewall pass-thru connections for loose or broken connections.
5. If no problems are found with the harness, 12V is present at the radar harness connector and the SAE J1939 bus resistance is 60 ohms, replace the radar sensor per the Radar Sensor Replacement procedure in Section 3.
6. Pins 2 and 3 are not used.

Display Harness Electrical Checks

The display harness is connected to the OnGuard Display mounted in the dashboard. Figure 2.32. The following harness checks should be followed when various fault codes occur. Refer to Troubleshooting Guide, Table A and Table B for further information.

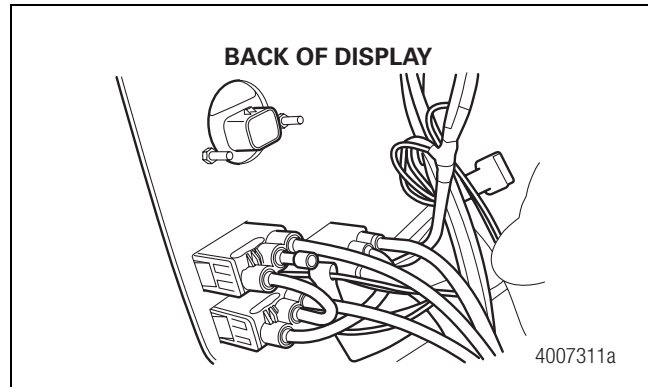


Figure 2.32

Remove the dash to access the back of the OnGuard Display and harness connector. Figure 2.33.

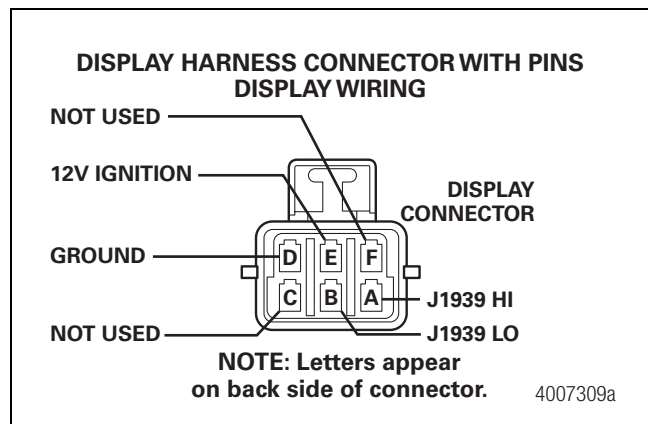


Figure 2.33

Disconnect the OnGuard Display harness connector and perform the following electrical checks.

1. Key On/Engine Off — Check Pin E (power) to Pin D (ground) for 12 volts.
 - If power shows 12 volts, go to step 2.
 - If power shows less than 12 volts, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. If damage is found, repair and replace as necessary.
2. Key Off/Engine Off — Check Pin D (ground) to chassis for resistance of less than 1 ohm.
 - If the resistance is less than 1 ohm, go to step 3.

2 Diagnostics, Troubleshooting and Testing

- If the resistance is higher than 1 ohm, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. If damage is found, repair and replace as necessary.
3. Key On/Engine Off — Perform a load test across Pins E and D by connecting a 12-volt headlight or test lamp to the pins.
 - If the lamp illuminates correctly, go to step 4.
 - If the lamp does not illuminate, trace and inspect the harness for severe abrasion or kinks that might crush or cut wires and check all connections for corrosion or connector damage. If damage is found, repair and replace as necessary.
 4. Key Off/Engine Off — Check across Pins A and B (SAE J1939) for resistance of 60 ohms.
 - If the resistance is 120 ohms, check the two termination resistors. Each should measure 110-130 ohms across the resistor pins. If each individual resistor does not measure 110-130 ohms, replace the bad termination resistor.
 - Check harness SAE J1939 circuits for open or shorts. If the resistance between Pins A and B is greater than 120 ohms, both SAE J1939 circuits are open or both termination resistors are missing. Repair and replace as necessary.
 - If the resistance between Pins A and B is equal to 120 ohms, one of the SAE J1939 circuits is open or one of the termination resistors is missing. Repair and replace as necessary.
 - If the resistance between Pins A and B is less than 60 ohms, more than two termination resistors are installed, the SAE J1939 harness is shorted or one or more ECUs on the SAE J1939 network are damaged. Remove each ECU connected to the bus one by one until the bus resistance returns to 60 ohms. Repair and replace as necessary.

NOTE: Make sure to check the firewall pass-thru connections for loose or broken connections.
 5. If no problems are found in the harness, 12V is present at the display connector, the SAE J1939 network resistance is 60 ohms and the connector is correctly installed, replace the display per the display replacement procedure in Section 3.
 6. Pins C and F are not used.

System Voltage Fault

Occasionally the vehicle battery, voltage regulator or alternator can cause the OnGuard Collision Safety System to generate high or low voltage faults. Refer to the Key ON section of the Radar Harness Electrical Check in this section to determine if correct power is supplied to the system if a radar undervoltage or overvoltage fault code is present. Troubleshoot the vehicle alternator, battery and voltage regulator as required.

SAE J1939 Network

SAE J1939 network communication errors can occur if all components interacting with the OnGuard Collision Safety System are not correctly connected to the network, are transmitting at a different rate than expected or the termination resistors are missing or not correctly positioned at the ends of the SAE J1939 network. Perform the Radar Harness Electrical Check in this section if a radar SAE J1939 network fault code is present.

Display Message Timeout Error

Occasionally the OnGuard Collision Safety System will generate Display Message Timeout faults because the OnGuard Display has stopped sending messages to the radar sensor at a 250 ms rate. This can be caused by an intermittent OnGuard Display power or intermittent SAE J1939 data link connection. Perform the Display Harness Electrical Checks in this section if a Display Message timeout fault code is present.

Display Message Data Error

If the Display Message fault occurs, replace the display per the Display Replacement procedure in Section 3.

Component Message Fault Troubleshooting

Refer to Table A and Table B for further information.

The following sections and sub-sections are the troubleshooting sections and sub-sections referenced in the last column of Fault Code Tables A and B.

2 Diagnostics, Troubleshooting and Testing

Message Timeout

Occasionally the OnGuard Collision Safety System will generate Message Timeout faults due to data not being received from the ECUs connected on the SAE J1939 network. This can occur if the cruise control, engine, transmission, ABS, tachograph, engine retarder or driveline retarder ECUs have been re-flashed with new software that is incorrect, was not downloaded correctly or has the incorrect parameter set. This information may reside in the vehicle OEM ECU database. It is also possible that various ECUs are not operating correctly on the SAE J1939 network or faults have occurred during diagnostic procedures. Perform the following procedure if a Message Timeout fault code is present:

NOTE: Certain diagnostic software programs, other than TOOLBOX™, can generate Timeout faults. Verify code is Active on the display without any other diagnostic software connected to the vehicle.

1. Determine if the software or parameter set from the appropriate ECU has recently been modified. Install the correct software and parameter set if required.
2. Verify that the SAE J1939 network is functioning correctly. Use the Radar Harness Electrical Checks procedure to repair any SAE J1939 network issues.
3. After any ECU servicing has been completed, cycle the ignition OFF for one minute and then back ON for one minute with the engine idling to clear the OnGuard fault. Verify that the fault has been cleared.

Message Data Error

Occasionally the OnGuard Collision Safety System will generate Message Data Error faults from ECUs connected on the SAE J1939 network. This can occur if an ECU has been re-flashed with new software that is incorrect, was not downloaded correctly or has the wrong parameter set. This information resides in the OEM ECU database. It is also possible that the problem ECU was replaced with the wrong ECU. Perform the following procedure if a Message Data Error fault code is present:

1. Determine if the appropriate ECU has been recently replaced. Verify that the correct ECU part number has been installed. Install the correct ECU if required.
2. Determine if the ECU software or parameter set have recently been modified. Install the correct software and parameter set if required.

3. Use the OnGuard display to determine if the various functions (i.e., set, resume, accel, coast, etc.) are functioning correctly. Consult the OnGuard display operating instructions for more information.
4. After ECU servicing has been completed, cycle the ignition OFF for one minute and then back ON for one minute with the engine idling to clear the OnGuard fault. Verify that the fault has been cleared.

Engine Ignores ACC Control Fault

The Engine Ignores ACC Control fault may be generated due to other vehicle system faults or issues. Check for multiple OnGuard faults using the OnGuard display. If multiple faults are present, the Engine Ignores ACC Fault is most likely a secondary fault. Take corrective action for the primary fault first and cycle the ignition. Document all faults present. If the other faults are corrected and the Engine Ignores ACC fault is still present, then the Engine Ignores ACC Control fault becomes the primary fault. There is a communication issue with the other vehicle systems. Verify the Engine and Gateway ECU software is up-to-date and cycle the ignition.

Cruise Control System Troubleshooting

Refer to Table A and Table B for further information.

The following sections and sub-sections are the troubleshooting sections and sub-sections referenced in the last column of Fault Code Tables A and B.

Programming Faults

1. Verify with the OEM or engine manufacturer that the correct engine parameters are programmed to accept TSC1 messages from the Adaptive Cruise Control (ACC).
2. Reprogram the engine parameters if not correct. Refer to the vehicle manufacturer's service manual for further instruction.
3. Check for multiple faults using the OnGuard Display. If there are multiple faults, this is a secondary fault caused by other faults.
4. Correct the other faults and cycle ignition to clear this fault. If it is a single fault, update the engine and vehicle gateway software.

Anti-lock Braking System (ABS) Troubleshooting

Refer to Table A and Table B for further information.

The following sections and sub-sections are the troubleshooting sections and sub-sections referenced in the last column of Fault Code Tables A and B.

Brake Pedal Position (BPP) Sensor Fault

Occasionally a BPP sensor may become damaged or contaminated by the air system. To determine if the BPP sensor is operating correctly, perform the following procedure:

1. Turn ON the ignition and wait for OnGuard to power up.
 2. Operate the OnGuard Display MODE button until the "ACC Function" or "Component Test" screen is displayed. Then press the down button until the "Brake Pedal Position" is displayed.
 3. With the brake pedal not depressed, the brake pedal should display 0%. As the brake pedal is depressed, the display should advance from 0% pedal on to approximately 70% with the brake pedal fully depressed. If the display goes from 0% to approximately 70%, the test is completed.
- NOTE:** The highest value of Brake Pedal Position is dependent on the air pressure in the brake system. It is common for values less than 100% to be displayed with the brake pedal fully depressed.
4. If the display does not advance as described, the BPP sensor may be damaged, blocked by air system contaminants (water, ice, oil, etc.) or the harness and connections may be damaged. Figure 2.34.

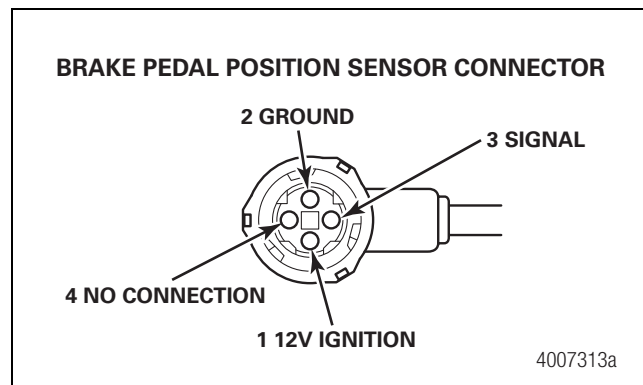


Figure 2.34

5. Inspect the harness for damage and repair if damaged. Disconnect the wiring harness at the BPP sensor. Verify 12V is present at Pins 1 and 2 of the BPP sensor harness connector. If 12V is not present, correct the harness issue. Refer to the ABS service manual MM-0112 and the vehicle manufacturer's service manual for further instructions.
6. Reconnect the wiring harness and cycle the ignition OFF for 30 seconds and then back ON. Using the OnGuard Display, verify if the BPP sensor is now operating correctly. If OK, the repair is completed.
7. If the BPP sensor is still not operating correctly, remove the sensor from the air line and verify that the BPP sensor output is 0%. If not at 0% call OnTrac Customer Service at 866-OnTrac1 (668-7221) for further instructions. The BPP sensor may not be operating correctly, and if so, remove the BPP sensor from the vehicle and replace it.
8. If the BPP sensor output is 0% with the sensor still disconnected from the vehicle, blow into the sensor port and verify the output increases as air pressure increases.
9. If the BPP sensor output does increase, inspect the air system for contamination and repair as needed.
10. If the BPP sensor output does not increase while blowing in the sensor port, replace the BPP Sensor. Refer to the ABS service manual and the vehicle manufacturer's service manual for further instructions.

NOTE: On rare occasions, vehicles with a frame-mounted ABS ECU have experienced a harness splice that is not robust. Inspect the harness at the large T section for signs of leakage, damage, chaffing, etc. Repair and replace the harness as necessary.

NOTE: The BPP Sensor Fault may occur occasionally during very light brake pedal applications with radar software versions USO 1.0013 and USO 1.0014. It has been corrected in all later radar sensor software revisions. Verify the software level in the radar per the Radar Sensor and Display Software Levels section. If the software version is USO 1.0013 or 1.0014, replace the radar sensor per the Radar Sensor Replacement procedure. If the procedures documented here do not correct the BPP Sensor Fault, refer to the ABS stability system service manual to service the BPP Sensor.

2 Diagnostics, Troubleshooting and Testing

Stop Lamp Relay Fault

Occasionally an ABS retarder relay fault may occur. The system uses this ABS function to turn ON and OFF the stop lamps when OnGuard is commanding the braking. If this ABS fault occurs, perform the following procedure:

1. Use TOOLBOX™ to activate the stop lamp relay by using the retarder relay command. The stop lamps should turn ON and OFF. If the stop lamps operate, clear the ABS fault code. If OK, the repair is completed. If it is not OK, proceed to step 2.
2. Inspect the stop lamp harness between the ABS ECU and the stop lamp relay. Correct any harness issues.
3. Verify that the relay has power. The fuse that powers the relay may need to be replaced.
4. Remove the relay from the socket. Using a multi-meter, verify the relay coil resistance (Pin 85 to Pin 86) is about 85 ohms. If the coil resistance is open, replace the relay.
5. Use TOOLBOX™ to activate the stop lamp relay by using the retarder relay command. The stop lamps should turn ON and OFF. If the stop lamps operate, clear the ABS fault code. If OK, the repair is completed.

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Release all air from the air systems before you remove any components. Pressurized air can cause serious personal injury. Refer to the vehicle manufacturer's service manual for instructions.

Radar Sensor

WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Radar Sensor Assembly Ball Socket Clips and Alignment Screws

Occasionally the radar sensor may become loosened from the mounting hardware by an impact on the front of the sensor. This can cause any or all three of the sensor alignment screws to disengage from the corresponding ball socket clips. When this occurs, the radar sensor can become misaligned or can operate erratically. The impact may or may not damage the radar fascia, radar or any of the radar mounting hardware depending on the severity of the impact.

To correctly inspect the integrity of the radar mounting hardware, hold on to the radar and wiggle it back and forth. There should not be any physical or visual movement or slack in the radar, ball socket clips, screws, through-hole adjusters or rivets. Ensure there is at least 1/4-inch (6.35 mm) of clearance between the fascia, radar sensor and the bumper in all directions. Contact between the radar sensor and bumper can cause damage to the through-hole adjusters, ball socket clips and radar screws.

If the radar sensor has become loose and the plastic ball socket clip is not damaged, place a tool between the back of the radar sensor and the bracket near the dislocated ball screw socket. Gently pry the radar sensor away from the bracket until the ball socket engages with the alignment screw.

If the plastic ball socket clip has been damaged, remove the damaged ball socket clip with a pair of pliers. Install a replacement ball socket clip at the damaged location and re-seat the radar sensor to the bracket assembly as described above.

Early vehicle installations used Torx T15 alignment screws to mount the radar sensor to the bracket. Replacement alignment screws now incorporate a larger stainless steel T20 Torx head with a deeper socket, shorter screw length and self-cutting threads. When using this new screw, be sure to use the correct T20 Torx bit to install the replacement screw and adjust the radar sensor. It is possible to use a T15 bit to install the T20 screw head, but it will frequently cause damage to the T20 screw. Also, be careful to check each screw to determine if it is a T15 or T20 screw and to confirm that the head is not stripped.

Radar Sensor Replacement

1. Turn the ignition switch to the OFF position.
2. Place blocks under the rear tires to prevent the vehicle from moving. Apply the parking brake.
3. Remove the two fascia mounting bolts and remove the fascia from the radar sensor. Figure 3.1. Note the orientation of the fascia. The fascia must be mounted with the indented "chin" positioned facing the radar electrical connector location. If the radar harness connector is on the top of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the top and is rightside up. If the radar harness connector is on the bottom of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the bottom and is rightside up. If the fascia has a "chin" rather than the "OnGuard" wording, the "chin" should be oriented over the radar connector, either on the top or on the bottom respectively.

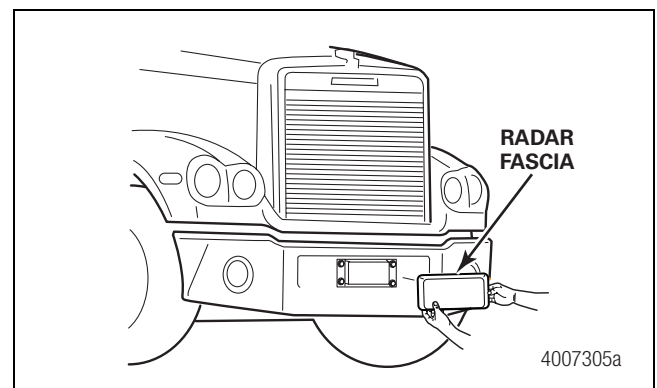


Figure 3.1

3 Component Replacement

4. Disconnect the radar sensor connector by depressing the lock tabs on both sides of the radar connector.
5. Remove the radar sensor from the radar sensor bracket by removing the three alignment screws. Figure 3.2.

NOTE: The radar alignment screws may be a T15 or a T20 Torx head. Using the incorrect size will result in damage and difficulty in removing. If damage to the Torx head occurs, replace with T20 Torx screws. Take care not to use excessive torque on the screws, thereby stripping the heads.

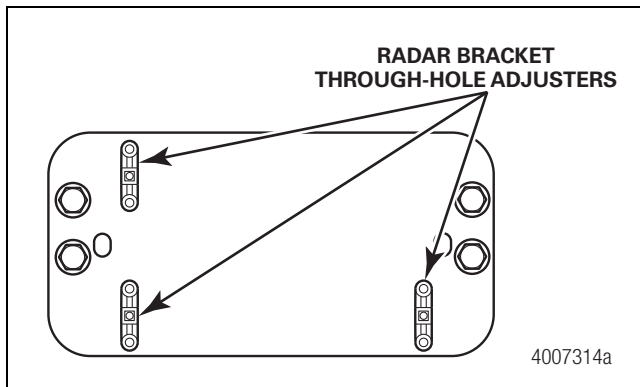


Figure 3.2

6. Verify that the mounting bracket bolts are securely tightened and the mounting bracket is in good condition. If the bracket is loose, repair or replace as necessary.
7. Inspect the three through-hole adjusters to make sure they are in good condition. Repair or replace as necessary. They must be riveted to the mounting bracket.
8. If replacement of any of the three alignment screws is needed, follow these instructions for installation screws into the ball socket clips.
 - A. Mount the radar sensor to the bracket. Walk the sensor onto the bracket by rotating each screw about three rotations each with multiple passes until the back of the radar sensor is about 3/4 inch from the radar bracket and is approximately parallel to the bracket. Wedge a small wrench handle between the radar sensor and the bracket near each ball screw socket. Gently pull on the wrench until the alignment screw ball head pops into the ball socket clip.
 - B. Make sure all three ball socket clips and alignment screws are seated correctly. No motion should occur between the bracket and the radar sensor if the screw is correctly seated in the ball socket. Figure 3.3.

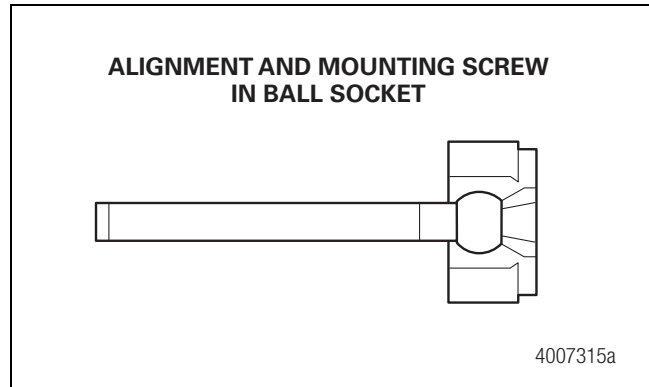


Figure 3.3

9. Turn the alignment screws in until the gap between the back of the radar sensor and the mounting bracket is 1/4 to 3/8 inch. This gap should be the same at each alignment screw location.
10. Verify that there is at least 1/4 inch gap between the radar sensor and the bumper. If there is not a 1/4 inch gap, turn the alignment screws in further or adjust the bumper to create this gap. **This gap is critical to the correct operation of the OnGuard Collision Safety System.**
11. Reconnect the sensor connector by pushing on the connector until it snaps into the radar sensor. Slide the rubber boot over the connector until the connector is completely covered by the boot. If required, snap the cable clip into the hole at the corner of the bracket and make sure the harness does not rub against any sharp edges.
12. Perform the Radar Sensor Alignment procedure in Section 2.
13. Replace the fascia using the bolts removed during sensor removal. Figure 3.4. The fascia must be mounted with the indented "chin" positioned facing the radar electrical connector location. If the radar harness connector is on the top of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the top and is rightside up. If the radar harness connector is on the bottom of the radar, the radar fascia should be oriented so the wording "OnGuard™" is on the bottom and is rightside up. If the fascia has a "chin" rather than the "OnGuard" wording, the "chin" should be oriented over the radar connector, either on the top or on the bottom respectively.

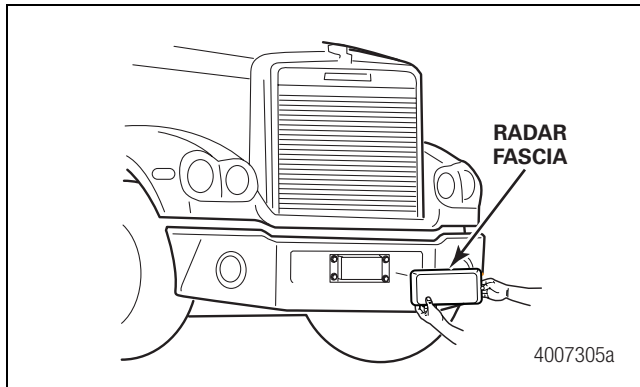


Figure 3.4

Display Replacement

⚠ WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. There are two methods in which the OnGuard Display can be installed.
 - A. Mounting screws through the instrument panel
 - B. Velcro tape holding the OnGuard Display to the instrument panel
2. If the OnGuard Display is mounted using mounting screws, the instrument panel needs to be removed in order to unscrew them from the back of the panel. Follow the vehicle manufacturer's recommendation for removal of the instrument panel. Figure 1.4.
3. If the OnGuard Display is attached with Velcro, the instrument panel does not need to be removed. Loosen the display from the panel.
4. Make sure the ignition is in the OFF position. Disconnect the wiring connector from the OnGuard Display.
5. Remove the OnGuard Display.
6. Connect the wiring connector to the new OnGuard Display.
7. Reinstall the new OnGuard Display using one of the two attachment methods.

4 Appendix

Product Information Letter #504

OnGuard™ Radar Harness Re-Routing on Freightliner P2 Century Chassis (Built in 2007 and 2008)

If the radar harness is worn or radar is not functioning, please use the following routing instructions for new radar harness (P/N: 400 850 801 0). For additional OnGuard™ service information, contact the OnTrac Customer Service Center at 866-OnTrac1 (668-7221).

The following steps provide information for properly re-routing the radar harness with P/N: 400 850 801 0.

1. Plug the harness into the radar sensor.
2. Route the harness around the right side of the sensor and up through the hole in the frame above it.
3. Once the harness is through the hole in the frame, continue to run the datalink portion of the harness towards the driver's side along the crossmember, fastening it with cable ties along the way.

⚠ CAUTION

Do not over tighten the cable ties as this will damage the wires.

Do not route the harness underneath or around the radiator as this will cause damage to the harness as well.

4. The radar harness end will plug into the "A" position of the J1939 extension harness. Figure 4.1 and Figure 4.2. The other end of the harness (radar power) will follow the crossmember towards the passenger side and will plug into the short radar power jumper harness coming from the center bulkhead connector.

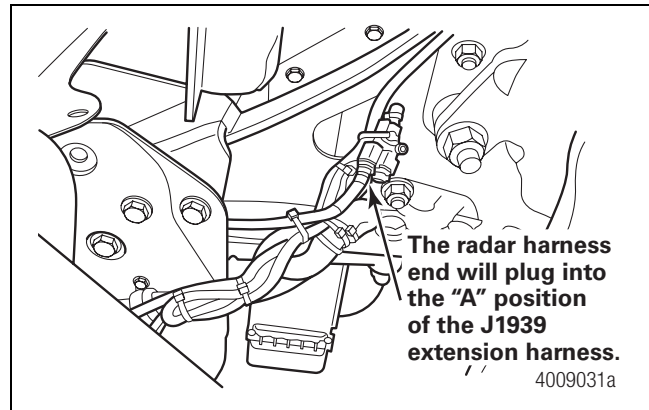


Figure 4.1

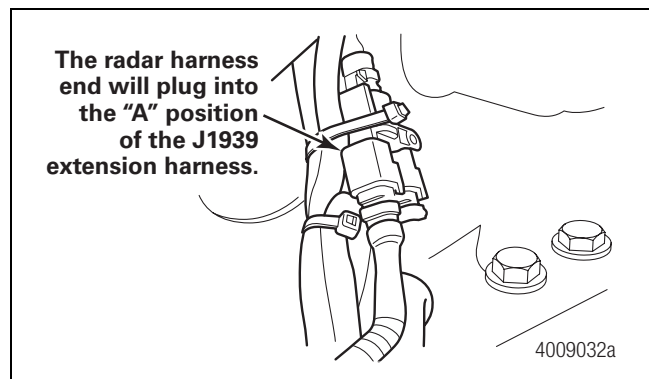


Figure 4.2

Meritor WABCO Vehicle Control Systems

2135 West Maple Road
Troy, MI 48084-7121
866-OnTrac1 (668-7221)
meritorwabco.com

Copyright 2011
Meritor, Inc.

Printed in USA

Revised 04-11
Maintenance Manual MM-0951 (16579)

MERITOR WABCO